PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

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Vol. CVII
No. 26

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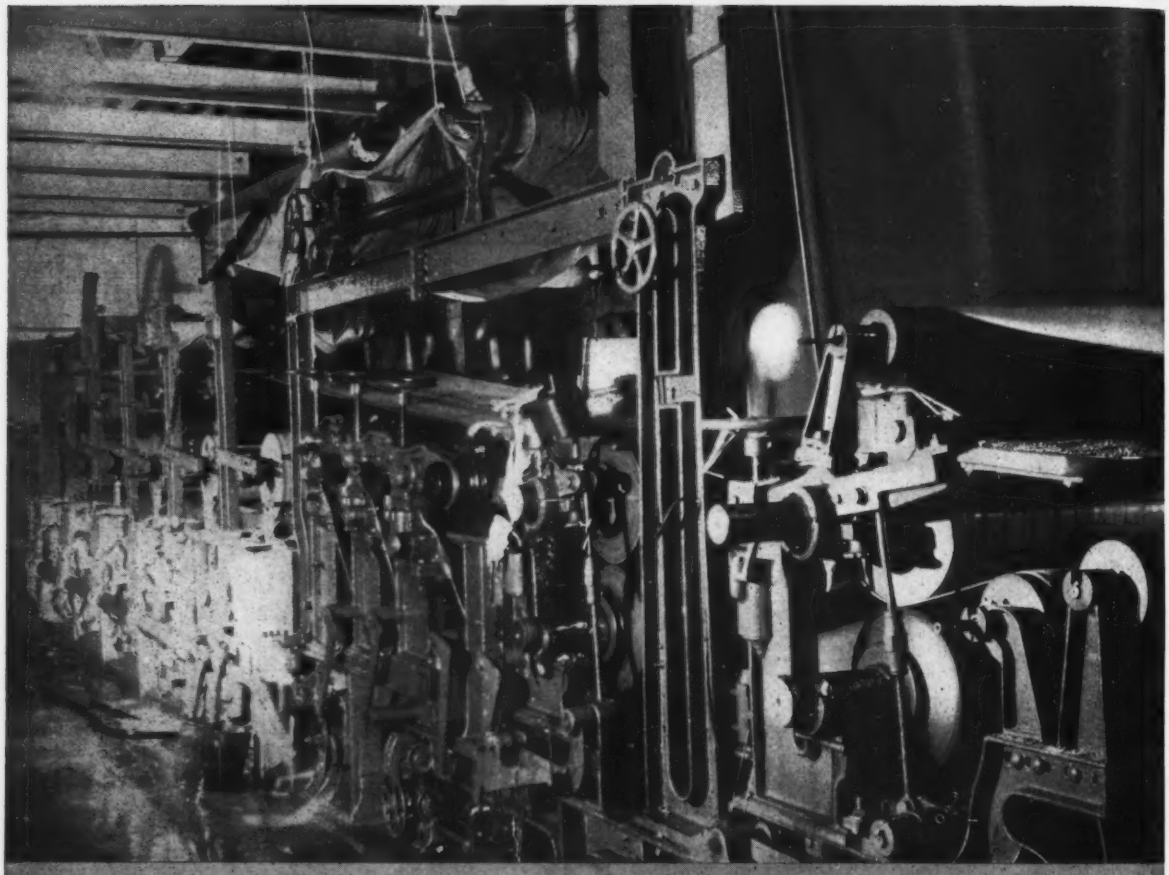
DOWNINGTOWN



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On the board machine illustrated is a new patented Downingtown Suction Extractor. The picture shows the machine operating without a top felt. With only two presses and two felts, the sheet has been put onto the dryers 41% dry.... No matter what kind of board you make, it is worth your while to investigate this wet end improvement which reduces the number of press nips, sends a uniformly pressed sheet onto the dryer section, cuts down felt and steam costs and produces a sheet with better finish.

DOWNINGTOWN MANUFACTURING COMPANY, DOWNINGTOWN, PA.

Entered as second class matter at the Post Office at East Stroudsburg, Pa., under the Act of Congress of March 3, 1879. Published every Thursday by the Lockwood Trade Journal Co., at 34 N. Crystal St., East Stroudsburg, Pa. Executive and Editorial office: 15 W. 47th St., New York, N. Y. Domestic subscription U. S. and possessions, $4.00 per year.

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Published Every Thursday by the LOCKWOOD TRADE JOURNAL CO., Inc.

Executive and Editorial Offices: 15 West 47th Street, N. Y. C.
Western Rep.—H. K. Vinton, 123 W. Madison St., Chicago, Ill.

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TABLE OF CONTENTS

D. Clark Everest Heads Marathon Paper Mills 9
Great Lakes Co. and the Newsprint Industry 10
Philadelphia Trade Celebrates Christmas 11
Provinces to Cooperate for Forest Industry .. 12
Premax Pressure Indicator 12
Financial News of Pulp and Paper Industry .. 13
Good Outlook for Hinde & Dauch 13
Estimate Abitibi Earnings 13
Bathurst Pays An Interim Dividend 13
Marathon Reports Profit 13
Glatfelter Co. Declares Dividend 13
Soundview Pulp Co. Earns Less 13
Hinde & Dauch Distributes Bonuses 13
Chip Classification Screen 14
New TAPPI Members 15
Chicago Trade Improves 15
Government Paper Bids 16
Spaulding Fibre Co. Gives Bonus 16
Southern States Pulp and Paper Club Arranges For Spring Meeting 18
Scott Employees Get Bonuses 18
Silicate Coating 18
Construction News 19
To Direct Southern Forest Program 19
Editorial 20
Taxes and Prosperity 20
Waste Trade Foundation Meets 21
Production Ratio Report 21
Pressure Indicator 21
Technical Section
Data on Heat Exchanger Performance 23
Isolation of Lignin with Benzyl Alcohol .. 28
First Barge of Pulpwood up Trinity 29
Review of Paper Industry Literature 30
Imports of Paper and Paper Stock 33
New York Market Review 35
Miscellaneous Markets 36
Market Quotations 38

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CAN YOU AFFORD TO FEED Slimform?

WHEN competition and reduced business activity turn the spotlight on production costs it's time to investigate the proven method of slime elimination which will drive Slimform from your door.

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Stock losses—bacterial decomposition and reworking of stock

Lowered Quality—slime spots—pin hole—objectionable odors

Increased Costs—in water, heat, labor, chemicals

Maintenance Troubles—blinded wires—plugged felts

Frequent Clean-ups—slime breaks, poor sheet formation

Obstruction of Lines—stock and white water lines

Recirculation Difficulties—slime growths in recirculated systems

Mechanical Strain on felts and wires—shortened useful felt and wire life

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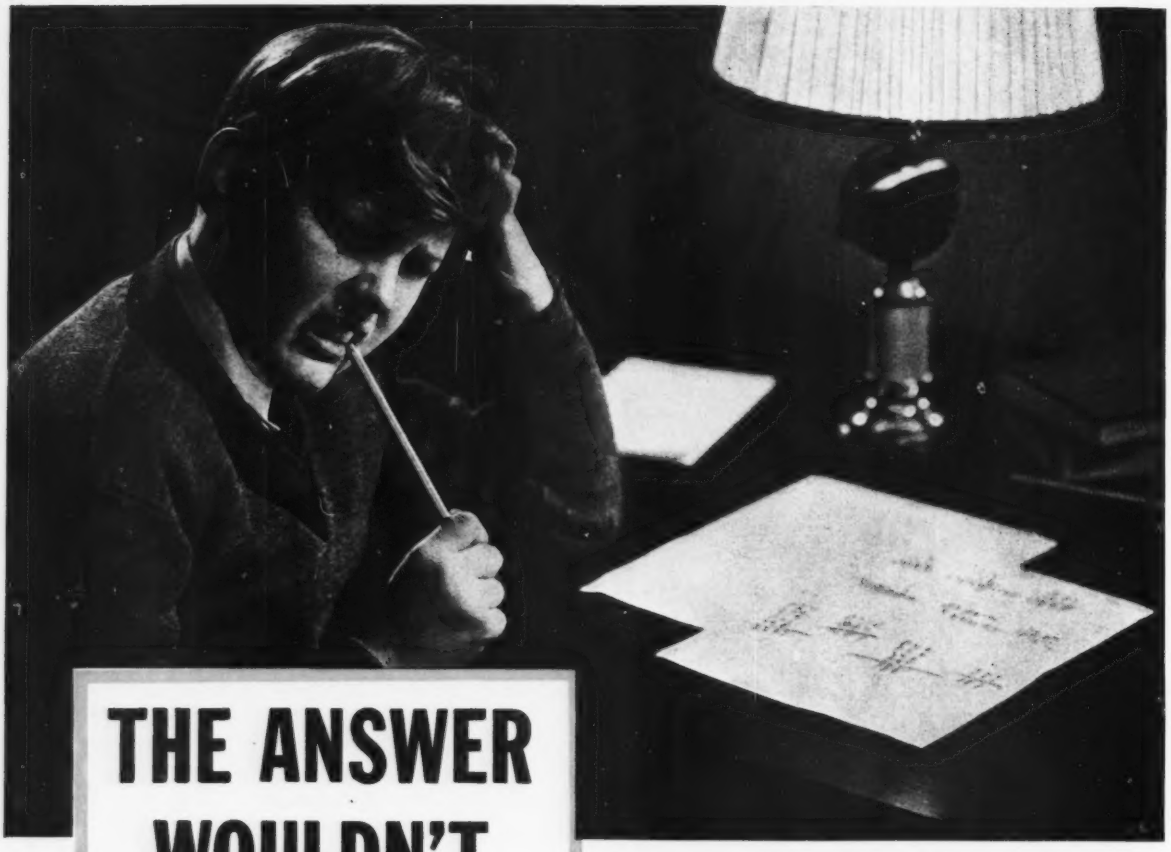

THE ANSWER WOULDN'T COME!

Day after day this paper company had wrestled with a tough problem in bearing lubrication

LIKE A KID with his first algebra equation, a large paper manufacturing concern had wrestled with a lubrication problem until they were blue in the face.

For years this company had experimented, trying to find a satisfactory lubricant for the dryer rolls of their paper machines. Learning of their problem, Shell engineers offered their services.

Working with the company's maintenance men, dryer-roll bearings were taken down and all parts, including oil wells, cleaned.

New babbitt was applied and bearings carefully reassembled. Then in each bearing a different lubricant was placed—including the Shell Lubricant specified by the Shell engineers for this type of job.

At the end of a ten-day run, in which bearing speed averaged 60 R.P.M., the bearings were taken down and the oil in each one drained off into bottles while still hot.

A careful examination of the results showed the superiority of the Shell Lubricant. The bearing was in perfect condition—not a trace of carbon present. The lubricant itself was in excellent condition, and but ¾ of a pint had been consumed in 269 hours of continuous operation. The problem was solved!

Those are the facts from Case History No. 319 in Shell's files. If you are having lubricating difficulties, you will do well to paste this ad in your hat. The men who solved this company's problem can lick yours. They bring you a big "plus" in lubrication—engineering skill tested in every industry combined with the finest lubricants being refined today. Simply call or write your nearest Shell office.

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PAPER — SIXTY-SEVENTH YEAR — PAPER

Established Feb. 17, 1899
Consolidated Nov. 16, 1899
with Paper Trade Journal.

Vol. CVII, No. 26 Thursday, December 29, 1938

Established Sept. 21, 1916
Consolidated Feb. 19, 1925
with Paper Trade Journal.

D. Clark Everest Heads Marathon Paper Mills

Election At Annual Meeting of Marathon Paper Mills Company Elevates D. Clark Everest To Office of President and C. C. Yawkey To Chairman of Board—Wisconsin Protests Freight Rates—Industrial News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., December 27, 1938—D. Clark Everest has been elevated to the presidency of the Marathon Paper Mills Company, with mills at Rothschild, Ashland and Menasha, Wis. His election took place at the annual meeting of the company December 20 at the offices at Rothschild.

Mr. Everest has been vice-president and general manager for many years. He succeeds as president C. C. Yawkey, who was elected to a newly created office of chairman of the board of directors. Mr. Everest is prominently known in the paper industry, as a stockholder and director in several paper mills and allied industries besides the Marathon. He also is a past president of the American Pulp and Paper Manufacturers Association.

Leo E. Croy of the Menasha Products division, Menasha, Wis., has been elected a vice-president, and John Stevens, Jr. and P. M. Wilson were re-elected vice-president and secretary-treasurer, respectively. A. M. Van Douser was elected assistant secretary-treasurer. Directors elected in addition to the above are: Ben Alexander, M. P. McCullough and Lester Armour, Chicago; L. F. V. Drake, New York City; Charles J. Winton, Minneapolis, and C. S. Gilbert, Wausau, Wis. Mr. Armour and Mr. Drake are new members of the board.

Annual reports showed net profits for the year ending October 31 to be $267,135. Preferred dividends amounted to $69,938, leaving $192,207, or 99 cents a share on common stock. In the previous year the common stock dividend was $4.10 per share.

Sales volume of the company was 10.45 per cent less than in the preceding twelve months. The factory payrool during the year amounted to $2,410,834, a decrease of $35,191 from the previous year. The principal decline was shown to be in the first two months of the fiscal year. Improvements and additions account for an increase of $360,796 in property.

Current assets were given as $5,624,035 against curernt liabilities of $1,965,431, a ratio of 3.36 to 1, with assets listed at $4,061,326 and liabilities at $1,209,757.

Business volume has shown substantial increases in the last two months over the same 1937 period, Mr. Everest stated. Both new orders and shipments are running ahead of a year ago.

Two new buildings are contemplated at the Menasha Product division at Menasha, according to a communication directed to the city council asking permission to alter sidewalk lines. It was indicated that one would be a new office structure, and the other an addition to the factory, both to be of fireproof construction. Plans are now practically completed by the architects.

New Dam on Site of Patten Paper Co.

Construction work was to be started this week on a new dam and powerhouse of the municipal utility at Kaukauna, Wis., utilizing the site on the Fox River of the former Patten Paper Company, Ltd. The city has received a WPA grant of $232,701 to aid in the work, which it is estimated will cost a total of $475,000. A request for $90,000 from PWA for the powerhouse and equipment is still pending.

Wisconsin Protests Higher Freight Rates

Philip H. Porter, general counsel for the Wisconsin Public Service Commission, Madison, Wis., filed a petition with the Interstate Commerce Commission last week holding that the proposed increases in freight rates on Wisconsin paper and paper products to southwestern United States are illegal, and demanding a public hearing before the rates are approved.

Railroads have filed increases ranging from 1 to 20 cents per 100 pounds to become effective January 1. Mr. Porter has demanded an investigation of the tariff schedules now in effect, and a suspension of the new rates pending the outcome of hearings.

The petition says the Wisconsin mills consider the southwest one of their best markets, and that they are in keen competition with rivals in the west and east although the proposed increases in rates do not affect those competitors. The present rates, it is stated, are those prescribed by the federal commission after a "thorough and comprehensive investigation of the Minnesota and Ontario Paper case." While in some instances they are the same as at

(Continued on page 16)

Great Lakes Co. and the Newsprint Industry

Newly Elected President of Great Lakes Paper Co. States Agreement Has Been Made With Newsprint Industry, But Head of Canada Newsprint Association Denies Agreement Has Been Reached—Late Industrial News.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., December 27, 1938—Affairs in the Great Lakes Paper Company, Limited, Fort William, Ont., are now running smoothly and Hon. Earl Rowe, newly elected president of the organization, states that an amicable arrangement has been arrived at between the newsprint industry and the company. Several conferences were held recently between the premiers and ministers of lands and forests from Ontario and Quebec, representatives of the newsprint enterprise and the president of the company. Mr. Rowe added that certain misunderstandings had been clarified and a basis of closer cooperation established. While the unique position of the Great Lakes Paper Company with reference to contractual obligations had been considered, a slight reduction in tonnage had been agreed upon by the company in order to render justice to the claims of all concerned.

Official Statement of Charles Vinning

Charles Vinning, president of the Newsprint Association of Canada, in an official statement with regard to a statement issued by Hon. Earl Rowe, president of Great Lakes Paper Company, Limited, said: "So far as Mr. Rowe's reported statement refers to any arrangement between himself and provincial governments I have nothing to say, but I wish to emphasize as strongly as possible that no agreement of any kind has been made between the Great Lakes Company and the newsprint industry. While Mr. Rowe's amicable attitude is fully appreciated, his reported statement must not be taken as expressing the views of representatives of the industry."

The statement of Mr. Rowe as reported by the press was as follows:

"As president of the Great Lakes Paper Company, I am pleased to announce an amicable agreement has been arrived at between the newsprint industry and Great Lakes Paper Company.

"By several conferences recently held between the premiers and ministers of lands and forests of Ontario and Quebec, representatives of the newsprint industry and the president of the Great Lakes Paper Company, certain misunderstandings have been clarified and a basis of closer co-operation re-established. While the company's unique position with reference to contractual obligations has been considered, a slight reduction in tonnage has been agreed to by the company in order to render justice to the claims of all concerned."

Operations of Kenora Paper Mills

With paper stocks in the hands of publishers carried over from 1937 to 1938 abnormally high and with a restricted demand during the past year, the operations of the Kenora Paper Mills, Kenora, Ont., were generally below average although the daily working time was more evenly distributed than in 1937. The high water also created a difficult situation and for a time operations were carried on only under great difficulties, emergency measures being necessary to protect the plant and keep it in operation. Continued activity of the mill at high water period was only possible owing to the fact that the supply of power for the company was made independent of the periodical fluctuations in the level of the Lake of the Woods inasmuch as power is now being delivered over the Winnipeg Electric Company's lines from Seven Sisters Falls at considerably added expense.

Forecasts Better Newsprint Conditions

E. E. Johnson, of the Pigeon Timber Company, Limited, Fort William, Ont., recently returned from an extended trip to the East. He says indications are that conditions in the newsprint industry will be better than during the past year with the possibility that some of the previous decline in demand will be regained. He added that there was no doubt but that the government was trying to do a constructive job with the diversified forest industries of the country. Some of the policies had been in effect for fifty years and changing them was a challenge to the leaders, but progressive steps were being taken in achieving the objective of putting the pulpwood and lumber industries of Canada in the low world cost class and thus controlling tributary markets as against the establishment of an artificial price, a policy which had never succeeded in international trade. The mass psychology of fear of war as well as the fear of further experimental legislation was lessening, he concluded, and major institutions and wealthy individuals were looking for investments in the basic consumer and endurable goods industries. The general feeling was that action was now added to be ready for the return of business normalcy.

May Stop Pulpwood Drive on Nipigon

Hon. Peter Heenan, Minister of Lands and Forests for Ontario, has given assurance to Fort William that to preserve the upper reaches of the famed Nipigon river for recreational purposes serious consideration will be given by the Ontario government to the proposal that an alternative route be designated for pulpwood driving. Business interests forwarded to Mr. Heenan vigorous pleas for the conservation of the Nipigon in the vicinity of Virgin Falls and proposing use of a western channel from South Bay to Lake Hanna for the driving of pulpwood. It was pointed out that in view of the many waterways of Ontario available for the purpose of bringing out pulpwood the government should not consent to the destruction of the choicest half dozen miles of all tourist waters.

Hon. Earl Rowe, the new president of the Great Lakes Paper Company, Limited, Fort William, recently paid a visit to the plant and met all the officers of the company.

Philadelphia Trade Celebrates Christmas

"Get Together Party" of Paper Trade Association of Philadelphia Well Attended With Addresses By Prominent Men In Paper Trade — Paper Cordage Association Entertains Sixty Children With A Christmas Party.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., December 27, 1938.—The "Get-together Party and Christmas Dinner" of the Paper Trade Association of Philadelphia, held in Benjamin Franklin Hotel at 6:30 Wednesday evening, December 21, gives certain promise of taking prominent place in the line of functions which have attracted more than local attention, and the appeals to the mind, the eye and the palate provided by committee in charge, under the direction of Doris E. Lewis, executive secretary of the Association, will long live in pleasant memory. More than one hundred and fifty representatives of the paper industry were guests.

Address By Prominent Men in Trade

President Killhour presented an epitomized outline of the association's activities, stressing the accomplishments of the recent membership drive. He introduced the speakers, among whom was Norbert Considine, president of The Paper House of Pennsylvania, who took his listeners down "Memory Lane" in the yesteryear of the paper houses and their locations in Philadelphia.

LeRoy S. Bishop, treasurer of the Association, who is credited with the honor of being the first chairman of the Credit Control Plan of the fine paper division, which has been in operation for over five years, stated that the bad debt losses for 1937 were one-seventh of one per cent, and that accounts outstanding over 90 days old in the fine paper division as of December 1, 1938, were a trifle less than 2 per cent of the total accounts receivable.

Arthur H. Chamberlain, executive secretary of the National Paper Trade Association, who was guest speaker, among other things cited three objectives for business organization, namely: information, education and accomplishment, and dwelt at length on the importance and advantages of these objectives. He paid tribute to Mr. Killhour's standing in the National Association, stating that it did not take long for men throughout the country to realize he was an asset and they have recognized him accordingly. Mr. Chamberlain stressed the interpendence of one on the other and pointed out the value of membership in the National Association. In the course of his address, he remarked: "What do we buy when we buy membership in the National Association? The man who asks that question is in exactly the same position as the man to whom he puts it. He shares alike in good and bad developments of the trade and every member of the Association buys the same thing. He buys a share in a mutual organization operated for mutual benefit."

Among others called upon for a brief talk were Arthur Sherrill, Leonidas Beck, Simon Walter, Allen E. Whiting, Morgan H. Thomas, William A. Hentz, T. H. Butler Smythe, Norbert A. Considine and Ormond Freile. Notably present among the distinguished guests were J. R. Howarth, newly elected president of the Paper & Cordage Association of Philadelphia, and Harold T. Robinson, of Whiting-Patterson Company, president of David Rittenhouse Paper Salesmen's Association.

Fourteen New Members Admitted

The following fourteen new members were welcomed into the Association by president Killhour: L. Resnick & Sons; Kessler Paper Company; Progressive Paper Company; Diamond Paper & Box Company; Dee Paper Company; George A. Bossler; Atlas Paper Products Company; Dubin Paper Company; Saxe Paper Company; Huff Paper Company; Goldman Paper & Paper Stock Company; Gallen Paper Company; Globe Paper Company, and A. Goldman.

Paper and Cordage Association Party

Business was neglected on December 20, from noon until 3 o'clock, while the Philadelphia Paper and Cordage Association entertained sixty happy children from the Salvation Army Settlement House at their annual Christmas Party in the Adelphia Hotel.

The crystal room of the hotel was ablaze with lights and reflections from the two huge Christmas trees which had been decorated the night before by a committee headed by president Joe Miller, Kent Lay, George Hooper, Hendrie Lloyd, assisted and directed by a group of the members' wives. Traditionally, Leonard Fitzgerald served as Santa Claus. Each child was given a sweater, a pair of shoes, a pair of roller skates, several toys and games and a ten pound bag of oranges together with two roomy shopping bags in which to carry away the presents.

After singing Christmas Carols, there was a short speech of welcome by President Joe Miller, a prayer by Rev. Croswell McBee, who was guest of honor; a word on behalf of the children by Brigadier Brown of the Salvation Army, and an impassioned plea for peace and friendliness at home by no other than Santa Claus himself.

New Officers of the Association

At the close of the party, President Miller turned the gavel over to the newly elected president, John R. Howarth. Mr. Howarth then announced the newly elected officers of the Association for the coming year, namely: Jack Shinners, vice-president; T. W. Monteith, treasurer; F. M. Kurz, secretary. The directors appointed for 1939 are Joseph H. Miller, E. K. Lay, George K. Hooper, Fred. I. Brower and E. L. Richards.

Two new members were enrolled during December; they are The Oval Wood Dish Corporation of Tupper Lake, N. Y., manufacturers of wood dishes, wax lined paper dishes, wood spoons, etc., who will be represented by E. J. Fay and G. S. Shields; and the Whiting-Plover Paper Company, 71 Murray Street, New York, manufacturers of Air Dried Bond, Ledger and Writings, who will be represented by Myron H. Paul.

Provinces to Cooperate for Forest Industry

Premiers Duplessis and Hepburn Announce Ontario and Quebec Provinces Will Cooperate To Assure Stability of Forest Industry—Index of Paper Securities—Subsidy Sought For Port Royal Mill — Other News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 27, 1938—Premier Duplessis, of Quebec, who was recently in conference with Premier Hepburn of Toronto, announces that the provinces of Ontario and Quebec will cooperate to the fullest extent to assure the stability of the forestry industry, and thereby assure the welfare of both manufacturers and employees as a whole. Since his return from Toronto Premier Duplessis has had a conference in Montreal with Hon. Peter Heenan, Minister of Lands and Forests of Ontario, Hon. Colin Campbell, Minister of Public Works, Hon. Earl Rowe, president of the Great Lakes Paper Company, Hon. J. L. Ralston, K.C., and Charles Vinning, president, Newsprint Association of Canada.

Stock Index for Paper Securities

The Montreal Stock Exchange and the Montreal Curb Market have started the publication of a daily index of the prices af pulp and paper stocks. The index comprises ten common stocks, including: Abitibi, Bathurst "A," Cons. Paper, Donnacona "A," Dryden, Fraser Voting Trust, Howard Smith, Lake St. John, Price Bros. and St. Lawrence Corp. The formula employed is an adaptation of Laspeyres' weighted arithmetic aggregative formula. Average month-end prices in 1936 are used as the base equalling 100, and the index is weighted by the number of shares outstanding. The daily index is arrived at by taking the closing price of each stock employed, multiplying by the weight in each case, and then dividing the aggregate of the products by the base aggregate and multiplying by 100. A daily record of the index is available from the beginnings of 1936. In the last three years the highs and lows of the index have been as follows:

	High	Low
1936	203.00	56.49
1937	374.69	89.70
1938 (to date)	150.89	67.84

Subsidy Sought For Port Royal Mill

From Saint John, N. B., it is announced that a petition has been presented to the Provincial Government from the unemployed of Lancaster parish seeking immediate investigation of the possibility of the re-opening of the Port Royal Pulp and Paper Mill at Saint John, under government subsidy, if necessary. It is pointed out that huge quantities of New Brunswick pulpwood have been shipped overseas during the past year, principally to Germany, and it is contended that such pulpwood should be processed within the province rather than exported in the raw state.

The suggestion was made that if export could not be prohibited a protective tariff of $6 per cord be imposed on each cord shipped out, and that the returns from such an export duty would provide sufficient funds to permit the Port Royal mill to be reopened and give immediate and lasting employment to 250 men. The matter has also been taken up by the Saint John Board of Trade in an effort to have the wood processed in the province.

In this connection it may be stated that the Provincial Government has no power to impose an export duty, all matters in connection with external trade lying exclusively within the jurisdiction of the Federal Government. Quebec, faced with a similar problem years ago got over this difficulty by inserting a clause in every lease for cutting on Crown lands to the effect that pulpwood cut on these lands must be manufactured in the province.

Canadian International Paper Company

The Supreme Court of Canada has dismissed the main appeal of the City of Three Rivers in a taxation case against the Canadian International Paper Company, Limited, in connection with the company's properties in that city.

The judgment calls upon the paper company to pay the city $113,894, instead of the $898,313 demanded by the city for taxes—general sewers, paving, and school—dating back to 1929.

The paper company won exemption from a $10,280 assessment for road taxes but lost a cross demand for recovery of $110,880 allegedly paid in error.

Outlook Improved for Lumber Trade

During the past week the annual meetings have been held in Montreal of the Montreal Lumber Association and the Wholesale Lumber Dealers Association. At these meetings the reports presented were to the effect that while conditions in the lumber industry had not been satisfactorory during the past year, the outlook had improved due to the new trade agreements between Canada and the United States and Great Britain and the United States and one also to the National Housing Act which recently came in to effect in Canada. J. E. Green was elected president of the Montreal Lumber Association and H. S. Cheesbrough, president of the Wholesale Lumber Dealers' Association.

Premax Pressure Indicator

In Leaflet No. 274, just issued by the Bachrach Industrial Instrument Company, 7000 Bennett street, Pittsburgh, Pa., the merits of the Premax Pressure Indicator are described. The Premax instrument, which is stated to be approved and used by the United States Navy and leading Diesel engine manufacturers, is a simple, direct-reading indicator, easy to operate and requiring no experience to obtain accurate readings. The micrometer scales are calibrated from 50 to 1500 lb./sq. in., in two pound divisions. Bulletin No. 273 shows a few typical applications of the Premax Indicator.

Financial News of Pulp and Paper Industry

Hinde & Dauch Report Net Income of Approximately $665,000 For Year Ending December 31 — Increase In Six Months' Operating Volume Enables Bathurst To Pay An Interim Dividend — Firms Give Bonuses.

NEW YORK STOCK EXCHANGE

High, Low and Last for the Week Ending December 28, 1938

	High	Low	Last
A. P. W.	2⅜	2⅜	2⅜
Armstrong Cork Co.	57½	52¾	57½
Celotex Corp.	18½	17½	18½
Celotex Corp., pf.	67¼	67	67
Certain-Teed Products Corp.	11½	10⅝	11½
Certain-Teed Products Corp., pf.	41	38	40
Champion Paper & Fibre Co.	31	28½	30¼
Champion Paper & Fibre Co., pf.	101½	101½	101½
Congoleum-Nairn Co.	29	27⅝	29
Container Corp. of America	15¼	15	15
Continental-Diamond Fibre Co.	9	8⅜	8⅝
Crown-Zellerbach Co.	14¼	12½	14⅛
Crown-Zellerbach Co., pf.	86½	85¼	85½
Flintkote Co.	29¼	27¾	29¼
Robert Gair	3⅝	3⅛	3½
Robert Gair, pf.	12	10¾	12
International Paper & Power	14⅝	13⅛	14½
International Paper & Power, pf.	50½	47	50
Johns-Manville Corp.	105	102	102
Kimberly-Clark Corp.	27	24½	27
MacAndrews & Forbes	29½	28¾	29½
Masonite Corp.	56½	55	55¼
Mead Corp.	11¾	10⅜	11⅛
Mead Corp., pf.	70	67	68
Paraffine Companies, Inc.	58¾	58	58½
Ruberoid Co.	32¾	31	32¾
Scott Paper Co.	48½	47⅞	48⅛
Scott Paper Co., pf.	113¼	113¼	113¼
Sutherland Paper Co.	30¼	30	30
Union Bag & Paper Corp.	12½	11⅜	12¼
United Paperboard Co.	6¾	6½	6¾
U. S. Gypsum Co.	113½	108¾	109½

NEW YORK CURB EXCHANGE

High, Low and Last for the Week Ending December 28, 1938

	High	Low	Last
American Box Board Co.	8	8	8
Brown Co., pf.	19¾	17½	19
Great Northern Paper	38⅝	38¼	38¼
St. Regis Paper Co.	2⅞	2⅜	2⅜
St. Regis Paper Co., pf.	56	56	56
Taggart Corp.	5	4¾	4¾

Good Outlook for Hinde & Dauch

With fourth quarter earnings expected to exceed September period, Hinde & Dauch Paper Company will probably report net income for year ending December 31, 1938, of approximately $665,000 or about $1.35 a common share after allowing for preferred dividend requirements.

The company earned $1,451,636 or $3.53 a common share in 1937 and for nine months ended September 30, 1938, net was $480,397, equal to 96 cents a common share.

Upward trend in the company's shipments which began in July continued through October, which was one of best months of year. In November business dropped off, but during first half of December there has been a contraseasonal increase.

Prospects for Hinde & Dauch in 1939, while contingent on the course of general industrial activity, now are that first half will be definitely better than like period this year, and that the favorable trend of shipments will continue. In early months, volume will be aided, it is anticipated, by sales of company's insulating material, consisting of multiple layers of corrugated board, for use in building construction, in refrigerators, and in automobiles. Producing containers, mostly of corrugated paper, for almost every field of industry, the company also will undoubtedly benefit from any gains in business generally.

Bathurst Pays An Interim Dividend

MONTREAL, Que., December 27, 1938—Accompanying cheques covering an interim dividend of 25 cents a share on its class A stock, is a statement from the board of directors of Bathurst Power & Paper Company to the effect that the financial position of the company has been well maintained and the declaration was well in line with the conservative policy adopted by directors. "While the business of the company has of course, been affected by conditions generally prevailing in the pulp and paper industry," the statement proceeds, "operating volume has progressively improved during the past six months as compared with that of the early part of the year."

Estimate Abitibi Earnings

TORONTO, Ont., December 27, 1938—A rough estimate can now be made of the earnings results of the Abitibi Power & Paper Company, Limited, Toronto, for 1938 based on the official monthly figures up to the end of November and official forecasts of shipments for the present month. Net profit available for depreciation and interest for the first eleven months was $2,656,716 and forecasted shipments for December indicate a profit of $330,000 for the final month or a total for the year of $2,986,716. Allowing for $1,785,000 depreciation, the same as last year, a residue is left of $1,201,716.

Marathon Reports $267,135 Profit

Marathon Paper Mills Co. and subsidiaries—for the year to Oct. 31—report a net profit of $267,135 equal to 99 cents each on 199,567 common shares, compared with a net profit of $856,506, or $3.93 a common share, for the year to Oct. 31, 1937.

P. H. Glatfelter Co. Declares Dividend

The P. H. Glatfelter Company declared a year end dividend of $4.69 per share to preferred stockholders, which includes 44 cents per share on accumulated dividend, totaling for the year $6.94 per share. Payable December 21.

Soundview Pulp Co. Earns Less

The Soundview Pulp Company and Subsidiaries reports as follows for the eleven months to November 30: Net income, $453,487, equal to 69 cents each on common stock, compared with $1,716,047, or $3.42 a common share in corresponding period a year ago.

Hinde & Dauch Distributes Bonuses

SANDUSKY, Ohio, December 27, 1938—The Hinde & Dauch Paper Company on December 21 distributed $35,000 in Christmas bonuses to its 2,670 employees in eighteen plants throughout the country.

Chip Classification Screen

By F. M. Williams [1]

On a recent chip size classification test from one mill, we found that the combined percentage of poor chips, that is oversize, rejected on a one inch screen and the sawdust passing a ¼ inch screen, amounted to 19.2 per cent.

To be sure, oversized chips are not a total loss but even when these are crushed or otherwise reprocessed, this loss is still very high due to excessive amounts of slivers, screenings, etc. Furthermore, there is a hidden loss from oversized chips in that when the cooking time and the strength of the acid is increased sufficiently to remove hard centers, this severe treatment results in injury to the stock from other chips which might be classified as good. Also, note time loss in digester due to unnecessarily long cooking.

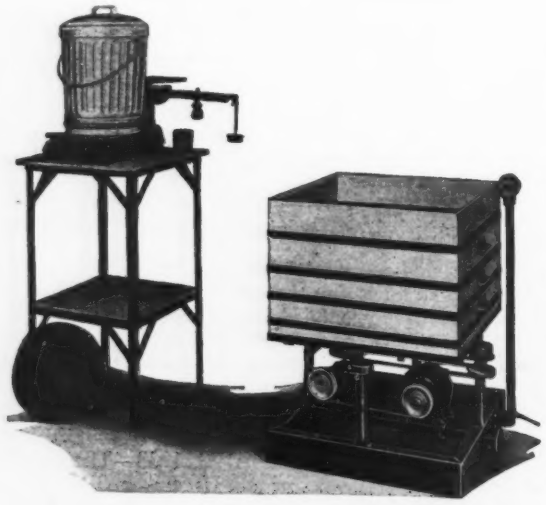
Regarding sawdust loss, there is little chance for an argument on this point. Soft wood at $14 a cord is expensive fuel under the boilers and pretty poor at that. It is well agreed that sawdust left in with the chips and cooked is of little value as the major portion of it disappears or is converted into exceedingly fine stuff so that common practice now is to screen out the sawdust from the chips before cooking.

Oversized chips and sawdust are produced in excessive amounts by dull chipper knives so that the remedy is readily at hand, namely; to see that the chipper knives are kept sharp at all times. Touching these up with a file is not sufficient. They should be removed and ground.

The best way to determine when your knives need sharpening and the bed plate reset, is to maintain a regular chip classification control and when you find the percentage of poor chips increasing beyond a predetermined limit, grind the knives.

One of the reasons why this important subject has been neglected so sadly is that hitherto, no one has taken the time or trouble to develop a practical chip classifier well adapted to the purpose.

[1] Consulting chemist and chemical engineer, Watertown, N. Y.



WILLIAMS CHIP TESTING OUTFIT

Chip Tests
WILLIAMS STANDARD CHIP CLASSIFIER
Williams Apparatus Co., Inc.
WATERTOWN, NEW YORK

Date Nov. 2, 1938.

4 AM	Spruce	4 AM	.395	23.95	8.2	31.9	31.2	20.3	8.5	83.3	16.7	12.4

STANDARD REPORT FORM OF CHIP ANALYSIS

To be of practical value, a chip classifier should meet the following specifications:

1. It should have sufficient capacity to take a sample sufficiently large, say at least ten pounds or one cubic foot in order to give a fairly representative average of the lot sampled.
2. It should embody a mechanical shaking device so that the human element in shaking is eliminated.
3. It should be of sturdy construction in order to withstand the hard service of a pulp mill.
4. The device should be provided with a mark time switch so that the time of shaking during test will be uniform.
5. The whole operation of chip testing should be so simplified that it does not require a highly trained technical expert to do it. In fact, the chip classifier should be placed in the wood room and its operation should be so simple that anyone who is intelligent enough to be entrusted with the care and upkeep of the chipper, can readily take a sample of chips coming from the chute and make the test quickly.
6. The screens should be of uniform opening or mesh and the wire should be of definite fixed diameter in order that a fixed classification may be put upon a standardized basis.

The Williams Apparatus Company has developed a machine meeting all of the above specifications having a capacity sufficient to handle one cubic foot sample, or at least ten pounds on a weight basis.

It is provided with a mechanical shake giving a complete rotary motion thru a comparatively small radius—1 inch. This is much better than a backward and forward reciprocating motion which tends to arrange the chips with axes parallel during the shaking.

It is of sturdy construction with frame and supports electric welded so that there is no chance of anything becoming loose from vibration.

The mark time switch times the shaking period

uniformly. The test is easily and quickly made by anyone of ordinary intelligence. Three minutes shaking time has been found sufficient to pass all the chips of a given size thru its screen.

The wire and openings or mesh of the screens, conform to the standard specifications of both the American Society of Testing Materials and the United States Bureau of Standards.

A good set of accurate scales is provided for weighing the screened portions. Complete equipment for the analysis of chips also includes facilities for readily determining the moisture content as well as the density.

The following form for report of chip tests provides space for the entry of the data essential to an efficient chip control system.

If, for any reason, a different combination of screens is desired, these may be furnished in any standard mesh.

I wish to acknowledge the kindly cooperation of Mr. A. D. Merrill of Chemipulp Process Inc. in bringing to the writer's attention the urgent need of adequate chip control equipment, as well as furnishing valuable data upon chip preparation.

New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry has approved of the election to membership of the following:

C. Edward Ahlm, student, The Institute of Paper Chemistry, Appleton, Wis., has worked in the mills of the Northwest Paper Company and the John Strange Paper Company.

Henry J. Allison, Jr. Student, the Institute of Paper Chemistry, Appleton, Wis., was a 1936 graduate chemical engineer of North Carolina University and received his M.S. degree from the Institute in 1938. He worked at the Carolina Aniline and Extract Company, Whiting-Plover Paper Company and the Brunswick Pulp and Paper Company.

Lewis R. Ayers, student, College of Forestry, Syracuse University, Syracuse, N. Y., worked at the Rising Paper Company.

Lewis I. Birdsall, specialist, General Chemical Company, Chicago, Ill., is a 1907 graduate of Williams College and received his M.A. degree in 1909 from Illinois University. He has been with the above company since 1922 and is Acting Manager of the Chicago office.

George J. Bowden, chief chemist, Escanaba Paper Company, Escanaba, Mich., is a 1929 graduate of University of New Hampshire. He was formerly chief chemist of the Parker Young Company.

Duncan S. Brown, student, Institute of Paper Chemistry, Appleton, Wis., received his M.S. degree in 1937 from the Institute. He was formerly with the Detroit Sulphite Pulp and Paper Company and the Gardner-Richardson Company.

Frank G. Calkin, research chemist, The Solvay Process Company, Syracuse, N. Y., is a 1923 graduate chemical engineer of Tufts College. He was formerly with the Massachusetts State Department of Health and Petroleum Chemical Company.

Robert W. Doe, Senior, University of Maine, was formerly a research chemist for R. T. Vanderbilt Company.

George F. Durand, chief engineer and secretary, Port Huron Sulphite and Paper Company, Port Huron, Mich., is a 1926 graduate of Michigan. He was formerly with the Thunder Bay Paper Company.

John J. Erchul, Jr., experimental chemist, Minnesota and Ontario Pulp and Paper Company, International Falls, Minn., is a 1933 graduate of Minnesota.

Cecil C. Fisher, electrical engineer, Hawley Products Company, St. Charles, Ill., is a 1931 graduate of Purdue. He was formerly with Delco-Remy, Majestic Radio Company, Magnavox Company and Chevrolet Motor Car Company.

L. Laurence Forward, engineer, Taylor Instrument Company, Chicago, Ill., is a 1924 graduate of Illinois. He was formerly superintendent of finishing of the Perry Knitting Company.

Harlow G. Funsett, chief engineer and superintendent, Hagar Strawboard and Paper Company, Cedarville, Ohio, is a 1912 graduate of Stout Institute and a 1916 graduate of Wisconsin. He was formerly with the Business Service Company and Ball Brothers Company.

James J. Hastings, superintendent of pulp mill. Port Huron Sulphite and Paper Company, Port Huron, Mich., has been with the above company continuously for 18 years.

Earl G. Hallonquist, research chemist, Rayonier, Inc., Shelton, Wash., received his degree of Doctor of Philosophy in 1933 from McGill University. He was formerly with the Dow Chemical Company.

Joseph L. Hoolihan, superintendent of Paper Mill. Port Huron Sulphite and Paper Company, Port Huron, Mich., has been with this company for 13 years. He was formerly with the Paper Converting Corporation, Combined Locks Paper Company and Thilmany Pulp and Paper Company.

Lynn D. Howell, chemical engineer, Marathon Paper Mills Company, Rothschild, Wis., is a 1937 graduate of Arkansas University. He was formerly with E. I. du Pont de Nemours & Co.

Chicago Trade Improves

CHICAGO, Ill., December 27, 1938.—Chicago's paper markets are preparing for the new year with a distinct undertone of improvement prevalent in this district. During the past ten days paper merchants have reported rather brisk buying, but whether this is due to the selection of paper to be used in taking inventory and preparing year end reports, has not been determined.

Aside from demand in these lines the general market is drifting along in its customary year end fashion with the hope that extremely low inventories now being made lower by buyers will force a marked upturn in demand during the early days of 1939. Book and cover markets remained about stationary during the week with the former reporting a fairly good production level. Krafts made little change during the week, the undertone reported not quite so firm but the production and output still continuing at a comparatively satisfactory pace. Bonds and ledgers showed a seasonal demand, particularly those grades purchased for inventory taking, record keeping, forms, etc., Groundwoods were unchanged while newsprint offices reported an entrance into 1939 with more optimism than prevailed last year. The waste paper markets are going to end the year in a soft position as a plentiful supply is on hand with the demand none too brisk.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 28, 1938.—The Government Printing Office has received the following bids for 18,300 pounds (150,000 sheets) of 28 x 34, 25 per cent rag, white ledger paper: R. P. Andrews Paper Company, 8.57 cents; Graham Paper Company, 8.75 cents; Mudge Paper Company, 8.41 cents; Barton, Duer & Koch Paper Company, 9 cents; Aetna Paper Company, 8.33 cents; Walker, Goulard Plehn Company, 8.9 cents; and Mathers-Lamm Paper Company, 7.98 cents.

For 14,350 pounds (100,000 sheets) of 32 x 42, buff sulphite writing paper: Mathers-Lamm Paper Company, 5.85 cents; Cauthorne Paper Company, 5.9 cents; Stanford Paper Company, 5.79 cents; Barton, Duer & Koch Paper Company, 5.43 cents; Graham Paper Company, 6.35 cents; Aetna Paper Company, 5.97 cents; and Marquette Paper Company, 5.5 cents.

For 150,000 sheets of 17 x 22, white gummed paper: Cauthorne Paper Company, $4.798 per M sheets; Old Dominion Paper Company, $4.619; Graham Paper Company, $4.62; Mudge Paper Company, $5.02; and Stanford Paper Company, $4.80; Barton, Duer & Koch Paper Company, $5.60; R. P. Andrews Paper Company, $4.69; Enterprise Paper Company, $4.718 less 2 per cent; Andrews Paper House of York, $4.71; Virginia Paper Company, $4.90; and Mathers-Lamm Paper Company, $4.84.

For 23,000 pounds (100,000 sheets) of 50 per cent rag, 22½ x 28½ white index paper: Walker, Goulard Plehn Company, 9 cents; Marquette Paper Company, 9.13 cents; R. P. Andrews Paper Company, 9.24 cents; Barton, Duer & Koch Paper Company, 8.47 cents; Stanford Paper Company, 8.9 cents; and Aetna Paper Company, 8.41 cents.

For 25,440 pounds (80,000 sheets) of 35½ x 46½, 50 per cent rag, white ledger paper: Walker, Goulard Plehn Company, 10.95 cents less 1 per cent; R. P. Andrews Paper Company, 9.84 cents; Barton, Duer & Koch Paper Company, 9.35 cents; Stanford Paper Company, 9.29 cents; and Graham Paper Company, 9.87 cents.

For 85,400 pounds (700,000 sheets) of 28 x 34 white sulphite writing paper; and 74,715 pounds (510,000 sheets) 28½ x 48, same (Item No. 2): Perkins-Goodwin Company, 4.6 cents; Old Dominion Paper Company, 5.258 cents; Graham Paper Company, 5.25 cents; Stanford Paper Company, 6 cents and 5.29 cents (Item No. 2); Barton, Duer & Koch Paper Company, 4.6 cents; R. P. Andrews Paper Company, 5.55 cents; Whitaker Paper Company, 4.95 cents; Mudge Paper Company, 5.16 cents; Cauthorne Paper Company, 5.2 cents; Aetna Paper Company, 5.57 cents; Marquette Paper Company, 5.03 cents; Mathers-Lamm Paper Company, 5.19 cents.

For 159,000 pounds (1,000,000 sheets) of 31½ x 48 M.F. book paper: Mathers-Lamm Paper Company, 4.97 cents; Frank Parsons Paper Company, 4.61 cents; Graham Paper Company, 5.14 cents; Mudge Paper Company, 4.63 cents; Perkins-Goodwin Company, 4.7 cents; John F. Post, Inc., 5.14 cents; Stanford Paper Company, 4.75 cents; Fitchburg Paper Company, 4.75 cents; Butler Paper Company, 5.23 cents; Barton, Duer & Koch Paper Company, 4.61 cents; R. P. Andrews Paper Company, 5.14 cents; Whitaker Paper Company, 4.5 cents; Cauthorne Paper Company, 4.52 cents; Old Dominion Paper Company, 5.137 cents; and Enterprise Paper Company, 4.93 cents.

For 10,000 pounds (52,000 sheets) of 27 x 38 chemical wood manila paper: R. P. Andrews Paper Company, 5.1 cents; and Barton, Duer & Koch Paper Company, 5.5 cents.

Heads Marathon Paper Mills

(Continued from page 9)

present, Mr. Porter said, in most cases substantial increases would result. Specific instances are cited on shipments between Wisconsin Points and Little Rock, Ark., to show how rates would be stepped up materially.

Employees Favor Local Union

In an election held last week at the Kimberly-Clark Corporation's mill at Kimberly, Wis., the employees favored the Kimberly Papermill Workers' Union by a vote of 553 to 33 as the exclusive representative of all hourly paid production and maintenance employees for collective bargaining. The election was conducted by the Wisconsin Labor Relations Board. The organization has more than 700 members and its officers are: Harold Fird, president; Otto K. Hannemann, vice-president; Cornelius Kokke, secretary, and Bernard Spaay, treasurer.

Open House at Fox River Mills

A Christmas "open house" was held by the Fox River Paper Corporation, Appleton, Wis., December 22, and approximately 1,000 persons made up of employees and their families took advantage of it. The company's four mills were open to inspection for two hours, and many of the families saw the inside of the plants for the first time. Lunches were served in two of the mills to the visitors as they passed through.

Address on Paper Making

An address on "The Chemistry of Paper Making" was given by Stephen Kukolich, research chemist at the Neenah Paper Company, Neenah, Wis., at a meeting last week of the Neenah Lions club at Valley Inn. He described the three principal processes of making pulp, soda, sulphite and sulphate. Samples of materials and grades were shown.

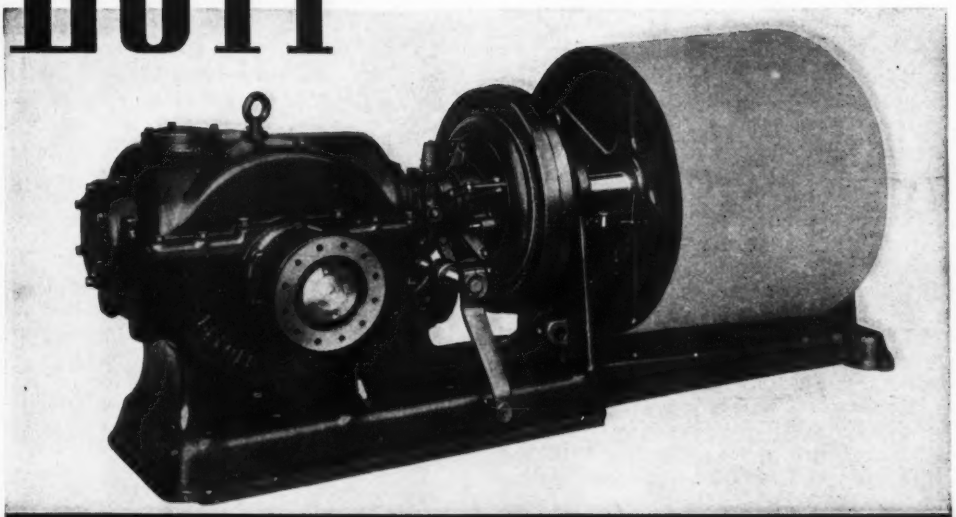
"Some Phases of Paper Chemistry" was the subject of an address by John Graff, research associate of the Institute of Paper Chemistry, Appleton, Wis., at a meeting of the Appleton Lions club at Conway hotel December 19.

Spaulding Fibre Co. Gives Bonus

[FROM OUR REGULAR CORRESPONDENT]

NORTH ROCHESTER, N. H., December 26, 1938.—Spaulding Fibre Company have distributed a bonus to 400 employees of the company. All who had been associated with the company for a year or more received the full amount, others pro rata.

BELOIT



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Hypoid Gear Drive

● **Gears cut of special steel are totally enclosed and operate in bath of oil. Gear and pinion shafts are mounted on roller bearings which are automatically lubricated.**

Equipped with improved Beloit automotive type clutch having unusually large air-cooled friction plate area. Oil lubricated throw out collar.

BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS

THE BELOIT WAY IS THE MODERN WAY

BELOIT IRON WORKS, Beloit, Wisconsin, U. S. A.

Southern States Pulp and Paper Club Arranges for Spring Meeting

Southern States Pulp and Paper Club held a dinner and meeting at the De Soto Hotel, Savannah, Ga., Monday December 19, to arrange for the spring meeting which will be held Tuesday, April 18, 1939, at the De Soto Hotel, Savannah. At this meeting thirty-one members were present and D. G. Moon, general chairman, outlined the proposed plan and appointed the committee to handle the various events.

At the spring meeting there will be arrangements for industrial visits in the morning and a luncheon will be held at noon, with a guest speaker, and this will be followed by a technical session at which some excellent papers on fundamental subjects will be read and discussed.

Members of the Trade and Forestry Associations or those directly connected with the paper industry who may be attending the Paper Festival at that time will also be invited to attend the luncheon and program as guests of the Southern States Pulp and Paper Club.

For recreational features the club will have available the various activities that have been arranged for the first Annual Southern Paper Festival, such as the Governors' Banquet and Formal Ball, the Historical Pageant featuring the story of paper which will be presented each night, and in the morning previous to the luncheon will have the opportunity of witnessing the grand parade of decorated floats featuring the Age of Cellulose. A special luncheon and program will be arranged for the ladies to include a fashion show and other entertainment.

The local committee of the Southern States Pulp and Paper Club for the Spring meeting are also arranging to present an educational exhibit at the Paper Products exhibition at the Auditorium. In this exhibit they will arrange educational features showing the elementary phases in the manufacture of pulp and paper as well as some of the more technical developments and by-products.

Another feature that will be sponsored by the Southern States Pulp and Paper Club for the education of the general public will be the working up of signs that will be distributed in conjunction with the general street decorative scheme at various points. These signs will contain fundamental information regarding the industry from its inception to the present time.

D. G. Moon, general chairman of the club, appointed the following local committees to handle arrangements for the Spring meeting: Secretary and Treasurer, O. W. A. Rodowski; Chairman of Technical Program, C. C. Carpenter; Chairman of Arrangements, H. F. McLeroy; Chairman of Registration, J. T. Wagner; Chairman of Entertainment, J. D. Robinson; Chairman of Reservations, W. F. Allen; Chairman of Ladies Committee, Mrs. W. F. Allen; Chairmen of Mill Visits, E. H. Mayo and S. W. Dodge; Chairman Forestry and Associations, M. S. Kahler.

For arrangement of the educational exhibit O. W. A. Rodowski was appointed chairman, A. O. Mortensen, vice-chairman, with R. H. Stevens for the by-product presentation, W. N. Moore for materials, R. B. Cowan for electrical effects, R. Ervin, Jr., for charts and signs and for the general assembly and attendance at the booth, L. L. Clapp, H. F. Scordas, J. H. Saile, W. T. Harbin, P. F. Ballinger, Jr., A. S. Boyer, O. M. Bridges, W. E. Ford, D. J. Czarnecki, H. E. Hazen, R. G. Butler, C. W. McClure and Kenneth Dodge.

The arrangement for the decorative street signs will be under the chairmanship of G. A. Ritter with C. Anchors and Jos. Fox assisting, and A. Earnest as chairman with M. Rawls will arrange a special pine tree decorative scheme.

With the interest and enthusiasm shown by the local committee undoubtedly the spring meeting of the Southern States Pulp and Paper Club will be of outstanding significance, and it was decided to hold another dinner meeting of this group on February 6. 1939, to arrange further details and at which time some educational and entertaining features will also be introduced into the program. W. F. Allen and R. B. Cowan were appointed as a committee to arrange for the February local meeting.

Scott Employees Get Bonuses

A Christmas service award was paid (December 22) to all of the 1200 employees of Scott Paper Company, Chester, Pa., and members of the company's sales organizations throughout the country. Employees who joined the company before January 1, 1938, received $25 plus $1 a year for each year of continuous service. Employees who joined the company between January 1, 1938, and June 30, 1938; July 1, 1938, and December 20, 1938, received $10 and $5 respectively.

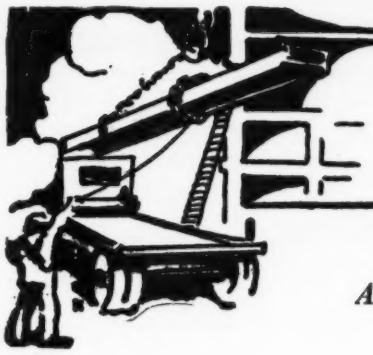
Today more people than ever before are engaged in carrying on the company's operations and in addition a program of further expansion, estimated to cost $2,500,000 is in progress.

August Richter in Perfect Health

The Stebbins Engineering and Manufacturing Company has wired the PAPER TRADE JOURNAL as follows:—"Please refer to page twelve of your issue of December 22 concerning item of the Dexter Sulphite Pulp and Paper Company directors. Kindly correct serious error creating death of August Richter and recognize that he is in perfect health and enjoying life immensely."

Silicate Coating

A bulletin just issued by the Philadelphia Quartz Company, Philadelphia, Pa., describes the application of the two brands of P. Q. silicate of soda, in the coating of paper stock to obtain moisture-resistance and grease proofing qualities. A typical diagram of installation for continuous coating is shown.



CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Chattanooga, Tenn.—The Atlas Paper Box Company, 1301 Cemetery avenue, manufacturer of paper boxes and containers, has filed plans for new one-story addition, for which superstructure will be placed under way at once. It will be used for storage and distributing service, and is estimated to cost close to $40,000, with equipment.

Detroit, Mich.—The Hinde & Dauch Paper Company, Decatur street, Sandusky, Ohio, manufacturer of corrugated boxes and containers, has awarded general contract to Otto Randolph, Inc., 53 West Jackson boulevard, Chicago, Ill., for new branch plant at Detroit, where tract of about 11 acres of land has been purchased at West Chicago boulevard and Pennsylvania Railroad, as recently noted in these columns. Main unit will be one-story, 200 x 510 feet, with a number of smaller structures adjoining for storage, distribution and other operating service. New plant will represent an investment of close to $500,000, including equipment and is scheduled to be ready for operation next April. Machinery will be installed to give employment to about 300 persons in different departments. Charles U. Harvey, Detroit, local representative for company for many years, with offices in the Stephenson Building, will be manager in charge of operations at the plant.

Chicago, Ill.—Brown Folding Boxes, Inc., 914-18 West Lake street, recently organized by C. E. Brown and associates, plans early operation of local plant for the manufacture of a line of folding paper boxes and containers. New company is capitalized at $75,000. S. P. Andrews and L. Thiersch are interested in the company.

Dayton, Ohio—Reynolds & Reynolds Company, Washington and Dudley streets, Dayton, manufacturer of paper specialties, has plans nearing completion for remodeling and improving a two-story building, formerly used for power house, for plant service, converting into a storage and distributing division. A shipping platform and other facilities will be provided. Bids will be asked soon on general contract. No estimate of cost has been announced. Walter A. Rabold, 341 Elmhurst road, Dayton, is architect.

East Rochester, N. Y.—The Lawless Brothers Paper Mills, Inc., manufacturer of fiber board products, container board, etc., has erection in progress on new addition to mill at Each Rochester, recently referred to in these columns, and proposes to have the unit ready for occupancy in about 60 days. It will be one-story, 55 x 240 feet, estimated to cost close to $60,000, with equipment, and will be used for storage and distribution, as well as other operating service.

Philadelphia, Pa.—Glant & Co., 328 North Randolph street, manufacturers of paper mill supplies, are considering rebuilding of portion of plant recently destroyed by fire. Loss reported over $75,000, including equipment.

Stamford, Conn.—The Keller-Dorian Paper Company, manufacturer of paper goods, will continue operation of mill at Stamford and will not remove plant to New York, as recently reported. Production will be maintained as heretofore. Company has moved its metropolitan offices from 390 Fourth avenue, New York, to 516 West Thirty-fourth street, where increased space has been provided.

Weston, Ont.—The Canadian Gypsum Company, Ltd., 1221 Bay street, Toronto, Ont., manufacturer of wall board and other gypsum products, has begun operations at new mill at Weston road and Oak street, Weston, comprising a tract of about 4 acres of land acquired close to a year ago, with mill building aggregating approximately 38,000 square feet of floor space. Company has modernized and improved plant, with installation of considerable new equipment, and is planning extensive production. Insulation materials will be manufactured at the plant, as well as other products.

To Direct Southern Forest Program

On February 1, 1939, Frank D. Heyward, Jr., will take over the position as administrator of the Southern Forest Conservation Program, sponsored by the American Pulpwood Association and adopted by the integrated pulpwood, pulp and paper industries of the South. The head office will be located in Atlanta, Ga.

Mr. Heyward has resigned as forester for the State of Ga. to undertake this new work, which he believes will present a broader opportunity for public service to the entire South.

Mr. Heyward is extremely well qualified by his ability and knowledge of conditions in Southern pine forests to direct the activities which have been described by Mr. Kircher, Southern Regional Forester, as "a forward-looking step which sets an example and a precedent for other wood-using industries."

PAPER TRADE
ESTABLISHED 1872
JOURNAL

Reg. U. S. Pat. Off.

George S. Macdonald, Pres. *Joseph P. Horgan, Secy.*
Executive and Editorial Offices, 15 West 47th St., New York, N. Y.

Henry J. Berger
EDITOR

Ronald G. Macdonald
Editor Technical Section

Lynne M. Lamm
Washington Correspondent

Per Copy, 10 cents United States, Per Annum, $4.00
Canada and Foreign Countries in Postal Union, $6.00

Member Audit Bureau of Circulations

Vol. CVII New York, December 29, 1938 No. 26

COMING EVENTS IN PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Sixty-second Annual Convention and meeting, Waldorf-Astoria Hotel, New York. February 20-24.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Roosevelt Hotel, February 20-23.

SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 21.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria Hotel. New York. February 20-22.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

TAXES AND PROSPERITY

Reasonable taxation is essential for prosperity. A practical and sound fiscal policy is likewise essential to establish entire confidence in the minds of millions of citizens who have money to invest, as well as banking institutions. The assurance that funds invested now will return a reasonable profit is lacking today and the Administration is attempting to revive prosperity by spending public funds, when liberal private spending can alone achieve a high permanent level of prosperity.

For this lack of confidence which continues to keep billions of private funds from productive use, the fantastic fiscal program of the Roosevelt Administration is entirely to blame. As the national debt will exceed 40 billion dollars at the end of the current fiscal year in June 1939, it is evident that the American people are at last becoming alarmed at the huge debt everyone must pay.

The burden of spending and the mounting taxes to finance the liberal program of the Administration, was sharply criticized by Senator Harry F. Byrd, democrat from Virginia, member of the Senate Committee on Finance, and chairman of the Senate Special Committee to Investigate Executive Agencies. In an address before the Massachusetts Federation of Taxpayers' Associations, on December 10, Senator Byrd directed attention to the dangers of continued federal deficits and suggested a program for federal economy.

In pointing out that Government grants place a burden on the States, Mr. Byrd said in part: "A grant to the States by the Federal Government is not a gift. Nothing would curb the wanton extravagance in our Federal Government more than a recognition of this very simple and elementary principle. Actually, every grant from the Federal Government in the past five years has in fact been a mortgage and a first mortgage, on the property of every citizen in each of the 48 States.

"In this confederation of States—United States of America—the parent Government has no money except such as is derived from the States by taxation. It has no security on which to borrow except the property of the citizens of the 48 States, so instead of a grant being a gift, the States are give a mortgage to pay with accrued interest, and the bureaucrats at Washington take a toll for top-heavy administrative cost, which, in some instances, as I have shown on the floor of the Senate, has equaled a full 33 per cent of the sum expended.

"Thirty Government corporations have been organized with authority to issue bonds, debentures and notes to the amount of $16,229,325,000. These obligations when issued are guaranteed in full for principal and interest by the Government of the United States, but I repeat, are not included in the debt you find reported in the Treasury statements. For nine years we spent more than our income for recovery and relief. Our deficit for the current fiscal year will be the largest in peace-time history.

"For recovery and relief we have spent $27,000,000,000 since the depression began. In addition, we have borrowed and loaned $8,000,000,000 more to citizens and corporations, much of which, I predict, will never be repaid to our Government. Our debt in 1932 was $16,000,000,000, with no contingent liabilities. On July 1, next, we will owe at least $41,000,000,000 in direct debt and will have a contingent liability, which is not listed on the financial statement of the Government and of which no Government official has made announcement. This liability is just as much of an obligation as the reported debt.

"With much difficulty, I have ascertained that on June 1, last, bonds, debentures and notes had been issued by these thirty Government corporations, over three-fourths having been sold to the public to the amount of $7,940,462,000, so that our actual debt on July 1, next, will approach $50,000,000,000, and may be much more if the maximum authorization to

issue $8,000,000,000 of bonds is exercised by these Government corporations. A single case in point is the Commodity Credit Corporation, with a capital stock of $100,000,000 and over $200,000,000 of notes sold to the public and guaranteed by the Federal Government.

"This corporation lost in its operations 94 per cent of its captial stock and received a Federal appropriation of $94,000,000 to pay this loss. And then to avoid the trouble of reporting future losses to the Congress, obtained on March 8, last, the passage of a law directing the Secretary of the Treasury to pay all losses without the formality of first obtaining an appropriation from Congress, and to automatically include such losses in deficiency appropriation bills."

In advocated need of reform to reduce expenses of the Federal Government, Mr. Byrd suggested a program as follows: "First, thoroughly organize the Federal Government for simplification, retrenchment and economy; and I propose to introduce such legislation. With equal emphasis I submit there should be a cancellation of the existing authority of 30 Federal borrowing corporations which now has power to add $8,000,000,000 to the public debt; and that such corporations, about which so little is known, should function through the budget, allowing Congress to approve or reject future expenditures.

"Inescapable in this program is the fact that, exclusive of relief, 30 per cent of the total expended by the Government today is for activities new to the Government in the last five years (the Greenbelts, and tree belts, and other such dispensable activities). Let these be reduced to the minimum and great sums can be saved without impairing the necessary functions of Government."

Waste Trade Foundation Meets

The first convention of the Waste Trade Foundation of America was held December 14-15 at the Hotel Sherman, Chicago. Harry R. Chapman, executive director of the Foundation was unanimously elected chairman of the convention. Nearly fifty representatives of waste masterial dealers attended.

The following officers were elected: President, Frank E. Wilcox, of Kansas City, Mo.; vice-presidents, Harold Schilling and Ben Chapman, of Chicago, Jacob Solotken, of Indianapolis, M. A. Aranow, of Detroit, M. Sajovitz, of Dayton, Oscar Noodleman, of Minneapolis, and Abe Field, of Fort Wayne. Treasurer, I. Cohen, of Chicago; assistant treasurer, Norman Robin; financial secretary, Arnold Epstein; general counsel and executive director, Harry R. Chapman.

Mr. Chapman delivered the principal address, and pointed out that past failures in the waste trade industry have in part been due to the fact that organization was started at the top of the industry rather than at the bottom among small dealers and retailers. It is the intention of the Foundation, Mr. Chapman said, to organize the small dealers and retailers first and expand from these to larger organizations.

Production Ratio Report

The statistics are based upon paper production reports to the American Paper and Pulp Association:

COMPARATIVE MONTHLY SUMMARIES

Months	1938(c)	1937(c)	1936	1935	1934
January	63.9%	90.3%	76.1%	65.8%	.....
February	68.7%	90.1%	77.9%	70.0%	.....
March	69.6%	90.3%	76.0%	70.5%	.....
April	68.3%	92.1%	82.3%	70.0%	.....
May	69.0%	90.6%	81.6%	69.4%	.....
June	66.0%	87.3%	80.7%	72.3%	.....
July	72.0%	81.8%	77.3%	64.9%	.....
August	77.2%	82.9%	81.5%	70.9%	.....
September	76.3%	78.6%	80.5%	71.9%	58.2%
October	82.5%	73.5%	87.6%	75.6%	64.7%
November	79.6%	61.9%	88.0%	75.3%	61.7%
December	.....	54.5%	85.9%	71.2%	59.6%
Year Average	.....	80.6%	81.3%	70.5%	.....
First 50 weeks	72.4%	82.0%	81.6%	70.7%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1938		CORRESPONDING WEEKS, 1937	
*November 12	80.9%	November 13	61.7%
*November 19	81.6%	November 20	62.5%
*November 26	74.4%	November 27	58.0%
*December 3	78.8%	December 4	61.0%
*December 10	77.8%	December 11	56.1%
*December 17	81.2%	December 18	60.0%

The following statistics show the number of mills reporting by ratio groups:

Ratio Limits	Number of Mills Reporting, Current Weeks: Nov. 12, 1938	Nov. 19, 1938	Nov. 26, 1938	Dec. 3, 1938	Dec. 10, 1938	Dec. 17, 1938
0% to 50%	76	62	96	57	58	46
51% to 100%	230	243	208	235	232	158
Total Mills Reporting	306	305	304	292	290	204

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported by individual companies.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

Mos.	1938 (e)	1937 (e)	1936	1935	Mos.	1938 (e)	1937 (e)	1936	1935
Jan.	55%	80%	61%	61%	July	57%	67%	69%	59%
Feb.	61%	86%	67%	67%	Aug.	66%	74%	75%	65%
Mar.	60%	87%	68%	67%	Sept.	66%	70%	76%	69%
Apr.	57%	89%	70%	61%	Oct.	70%	66%	82%	76%
May	58%	86%	68%	61%	Nov.	64%	56%	79%	70%
June	56%	75%	68%	65%	Dec.	....	46%	74%	60%

Week end. Nov. 12, 1938—66%
Week end. Nov. 19, 1938—67%
Week end. Nov. 26, 1938—57%
Week end. Dec. 3, 1938—61%
Week end. Dec. 10, 1938—64%
Week end. Dec. 17, 1938—65%

(e) Basic figures revised to include new members of the National Paperboard Assn.

Pressure Indicator

A booklet just received from The Statimeter Company, Limited, 41 North John street, Liverpool 2, England, describes the Statimeter, an accurate measurer and indicator of mechanical pressures. The instrument is both a dynamometer and a weighing machine and can be used for such purposes. The company states the glycerine is hermetically sealed in, cannot leak, that the instrument is unaffected by normal temperatures, will function if submerged in water or oil, and under the load is absolutely static.

The company states that among the applications to the paper industry, is that of accurately indicating pressure of beater rolls to reveal any mechanical defect, such as occurs when the rolls are not parallel with the bed-plate, pull of the driving belt, etc. When fitted to the couch roll, the Statimeter will record the pressure applied at either end of the roll, thus simplifying the determination of, and the application of equal pressures at the ends, giving longer service to the felts.

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Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Data on Heat Exchanger Performance*

By H. A. DuBois[1] and B. F. Smith[2]

Abstract

Methods are outlined for calculation of simple heat exchangers together with actual tests of commercial equipment.

Introduction

During the past few years we have replaced several old coolers with modern heat exchangers of our own design and manufacture, and have realized several advantages such as freedom from maintenance, reduction of cooling water consumption and recovery of heat.

During the past year we have had several inquiries from other mills regarding specifications for coolers for similar service. In general the inquiries indicated the need of a simplified detailed calculation method to enable solution of ordinary plant heat exchange problems.

There is an extensive literature concerning interchange of heat but it is not generally available, and a plant engineer or sulphite technician usually does not have the time necessary for choice and application of a method from the variety presented in the literature. The method presented is old. More precise methods are available and this paper is offered as an introduction to an interesting and valuable subject.

Types of Sulphite Coolers

Coolers for sulphite mill use may be grouped in three general types.

TYPE 1

Exchange of sensible heat between two liquids with forced convection in both sides of the apparatus and counter current flow.

Coolers of this type have been constructed for cooling the circulating waters for spray gas coolers, for cooling sulphite relief liquors, and for cooling calcium hypochlorite bleach solutions. The simplified method presented covers only applications of this general type.

TYPE 2

Condensing vapor in the presence of a non-condensable gas such as the cooling of digester relief gasses. Descriptions of two installations are given with references to the literature.

TYPE 3

Gas coolers with forced convection inside the tubes and natural convection outside as is the case in the conventional pond type burner gas cooler. Reference is given to a method of calculation that has been checked against actual service.

Study of the fundamentals of these various processes is suggested. Refer to standard textbooks such as "Principles of Chemical Engineering" by Walker, Lewis and McAdams, or the condensations presented in handbooks such as the "Chemical Engineers Handbook" edited by J. H. Perry. For more detailed treatment see "Heat Transmission" by McAdams. Each of these sources give many references to the foreign and to the periodical literature.

An understanding of the mechanism of heat flow from a warm liquid in turbulent flow, through a metal wall, and to another liquid in turbulent flow may be gained by consideration of the several temperature drops through a typical system.

Refer to Fig. 1, adapted from "Heat Transmission" by McAdams: Point t_1 represents the temperature of the core of body of the warm fluid in turbulent flow. The curve t_2, t_3 shows a drop in temperature caused by resistance to heat transmission through the fluid flow transition zone, where the flow changes from turbulent flow to laminar flow to an assumed condition of a stationary film in con-

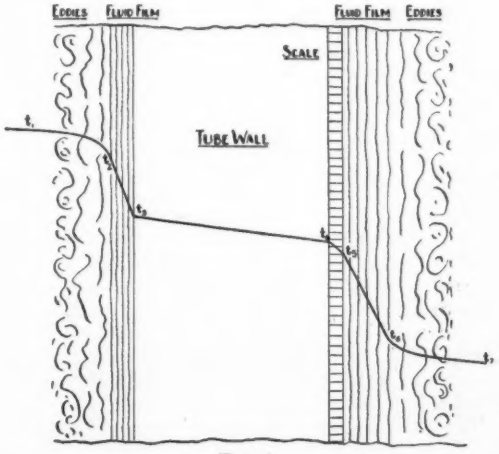

FIG. 1.
Temperature Gradient At One Cross Section of a Heat Exchanger.

* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Northland, Green Bay, Wis., September 8-10, 1938.
[1] Sulphite Staff, Kimberly-Clark Corp., Neenah, Wis.
[2] Process Engineer, Kimberly-Clark Corp., Neenah, Wis.

tact with the metal wall. The line t_3, t_4 is representative of the comparatively small heat gradient through the metal wall. The line t_4, t_5 illustrates the effect of pipe scale which also may influence the thickness of the fluid film by increasing the roughness of the surface.

Curve t_5, t_6 shows the temperature gradient through the second flow transition zone, and point t_7 represents the temperature of the turbulent core of the cooling medium. It is accepted that increases in average velocity of the fluids reduce the thickness of the fluid films, and give lower total resistance through the series. Individual resistances to transfer of heat are additive as in calculation of electrical resistances in series.

Liquids and gasses at rest present large resistance to heat flow in comparison to metals. For example see Table I which shows heat transfer coefficients for some common materials.

TABLE I

Substance	Temperature deg. F.	Btu./Hr./ Ft.²/°F./Ft.
Copper	212	218.0
Wrought iron	212	34.6
Lead	212	20.0
18-8 Stainless steel	212	9.4
Sulphur	212	0.09
Ice	32	1.3
Water (Liquid)	32	0.32
Water (Liquid)	212	0.415
Water (Vapor)	212	0.0126
Air	212	0.0129
Sulphur dioxide	32	0.0045

Measurements of the actual temperatures and dimensions at these boundaries are extremely difficult, and since the other properties of the fluids such as specific heat, viscosity and density vary with the temperatures within the films, recourse is taken to an overall method of calculation. An individual coefficient is derived for the film on each side of the metal tube surface, based on the mean temperature, varying directly with the (0.8) power of the average velocity, and inversely with the (0.2) power of the diameter of the tube.

Method

The detailed method shown below covers cases of exchange of sensible heat between two liquids, with forced convection and counter current flow. In the method we shall assume that the inner liquid is to be cooled.

1. Assemble all available data regarding the two liquids. For example, average and maximum flow in gallons per minute, seasonal changes in temperature, allowable pressure drop, and specific gravity of the fluids over the temperature range. Set up maximum temperature of delivery from the cooler as an objective. The values for specific heat and viscosity of usual sulphite mill liquors deviate so little from water values that they need not be considered.

2. Choose the type of apparatus. Use of a simple double pipe cooler is desirable in that standard fittings and procedures may be used. The designer has a wide choice of pipe sizes, and the apparatus can be arranged in various series and parallel combinations to suit flow rates. A basic combination for acid service could be a central liquor pipe of lead or stainless alloy, jacketed with wrought steel pipe to form an annular water space, and provided with means for relief of expansion stresses.

The basic design may be varied by provision of a bundle of small tubes within a common casing to give a more compact apparatus.

3. Set up the maximum hot liquid flow rate in pounds per hour and multiply by the temperature change to obtain the total b.t.u. change per hour.

4. Water flow rates may be determined by various means:

(a) Choose a water flow rate and calculate the rise in water temperature by reason of access of the heat value derived in (3). It is obvious that the water flow rate should be chosen so as to give a final water temperature appreciably less than that of the warm liquor entering the cooler so as to give an adequate differential or "driving force".

(b) Alternative Method:

Choose a reasonable water temperature desired at the "hot end" of the cooler, based on a possibility of heat recovery by reuse in some other part of the process. Calculate the temperature change and the volume of water required. High terminal water temperatures will require an increase in area and increase the cost of the cooler. Choice of the optimum installation requires complete calculations for three or more alternatives with consideration of annual charges for power, depreciation and maintenance balanced against the fuel savings effected by the reuse. For example, the original cost of a cooler installation may be materially reduced by choice of large volumes of cooling water and high velocities through the apparatus; but the cost of auxiliary pumps and the additional power and maintenance charges will tend to make an uneconomic installation.

5. Choose pipe diameters and number of units in parallel to give velocities of approximately 5 feet per second in both sides of the exchanger. This value will usually give good transfer with moderate pressure drop through the apparatus. If there is little allowable pressure drop by reason of existing pumping facilities it is possible to use velocities as low as two or three feet per second at an added first cost for the extra surface required. When liquids are not available at adequate pressures it is again desirable to calculate overall costs for various alternatives such as provision of a booster pump or pumps.

6. Prepare a calculation sheet similar to that used in the following "Sample Computation". (See following page.)

Probable Correspondence with Actual Results

Actual tests of the performance of four new heat exchangers transferring sensible heat between two fluids have been carried out recently. Liquid flow rates were determined by means of sharp edged orifices with mercury manometers for measurement of the differential pressure. Iron-constantan thermocouples and a Leeds and Northrup indicating potentiometer for normal temperature range were used for the temperature measurements except in the case of the bleach liquor cooler (Item "B"), in which case mercury-in-glass thermometers were used and calibrated in the range of the tests. The thermocouple potentiometer system is said to have an accuracy of plus or minus 0.2 deg. C in the temperature range employed. From 1½ to 2½ minutes were required to take a set of observations. Variations in flow rates and temperatures occurred during runs so that a large number of observations were taken, the results were plotted in relation to time, and data for one stable consecutive period for each series was averaged and used in the calculations. Theoretical overall co-

SAMPLE COMPUTATION

G.p.m. liquor side =		124.57
G.p.m. water side =		163.20
Liquor temperature entering—deg. F.		94.5
Liquor temperature leaving —deg. F.		73.9
Water temperature entering—deg. F.		64.4
Water temperature leaving —deg. F. (solved for in heat balance calculation)		80.7

Heat Balance

Liquor G.p.m. × lb./gal. (temp. diff.) × 60 min.
124.57 × 8.65 (94.5-73.9) × 60 = 1,332,000 B.t.u. per hr.
Water 163.20 × 8.33 (80.7-64.4) × 60 = 1,332,000 B.t.u. per hr.

N = No. of inside tubes in bundle	=		4
M = No. of bundles in parallel	=		1
D_1 = Inside dia. of inside pipe in inches	=		1.584"
d_1 = Inside dia. of inside pipe in feet	=	$D_1/12$ =	.132′
d_2 = Outside dia. of inside pipe in feet	=		.146′
d_3 = Inside dia. of outside pipe in feet	=		.505′
C_1 = Inside circumference of inside pipe in feet	=	$\pi d_1 = \pi \times .132 =$	.415′
C_2 = Outside circumference of inside pipe in feet	=	$\pi d_2 = \pi \times .146 =$	.459′
C_3 = Inside circumference of outside pipe in feet	=	$\pi d_3 = \pi \times .505 =$	1.59′
A_1 = Transverse area of inside of inside pipe in square feet	=	$.7854 d_1^2 = .7854 \times .132^2 =$	.0136′
A_2 = Transverse area of outside of inside pipe in square feet	=	$.7854 d_2^2 = .7854 \times .146^2 =$	.0167′
A_3 = Transverse area of inside of outside pipe in square feet	=	$.7854 d_3^2 = .7854 \times .505^2 =$	.200′
A_4 = Transverse area of annular space in square feet	=	$A_3 - NA_2 = .200 - 4 \times .0167 =$	.1332′
D_2 = Equivalent diameter of annular space in inches	=	$\frac{48 \times A_4}{NC_2} = \frac{48 \times .1332}{4 \times .459} =$	3.49"
Q_1 = Flow in one inside pipe in c.f.s	=	$\frac{\text{G.p.m.}}{450 \times M \times N} = \frac{124.57}{450 \times 1 \times 4} =$	.069
Q_2 = Flow in one annular space in c.f.s.	=	$\frac{\text{G.p.m.}}{450 \times M} = \frac{163.2}{450 \times 1} =$	.363
V_1 = Velocity of liquor in tubes—feet per second	=	$\frac{Q_1}{A_1} = \frac{.069}{.0136} =$	5.07
V_2 = Velocity of water in annular space—feet per second	=	$\frac{Q_2}{A_4} = \frac{.363}{.1332} =$	2.72
T_1 = Arithmetic average liquor temp.—deg. F. $= \frac{94.5 + 73.9}{2}$	=		84.2
T_2 = Arithmetic average water temp.—deg. F. $= \frac{80.7 + 64.4}{2}$	=		72.55
H_1 = Coefficient of heat transfer in inner film = B.t.u./sq. ft./degree/hr. $= 150 \frac{(1 + .01\ T_1)}{D_1^{.2}} V_1^{.8} = 150 \frac{(1 + .01 \times 84.2)}{1.584^{.2}} \times 5.07^{.8}$	=		924
H_2 = Coefficient of heat transfer of outer film = B.t.u./sq. ft./degree/hr. $= 150 \frac{(1 + .01\ T_2)}{D_2^{.2}} V_2^{.8} = 150 \frac{(1 + .01 \times 72.55)}{3.49^{.2}} \times 2.72^{.8}$	=		447
H_3 = Coefficient of heat transfer through metal tube = B.t.u./sq. ft./degree/hr. $= \frac{\text{Coefficient of metal per feet}}{\text{Thickness of metal in feet}} = \frac{9.2}{.0069}$	=		1330
r_1 = Resistance through inner film = $1/H_1 = 1/924$	=		.001082
r_2 = Resistance through outer film = $1/H_2 = 1/447$	=		.002238
r_3 = Resistance through metal tube = $1/H_3 = 1/1330$	=		.000752
R = Total resistance = $r_1 + r_2 + r_3$	=		.004072
C_t = Theoretical over-all coeff. of heat transfer = B.t.u./sq. ft./degree/hr.	=	$\frac{1}{R} = \frac{1}{.004072} =$	246
Δt_1 = Temp. diff. between inner and outer fluids at one end of apparatus—°F. = 73.9 — 64.4	=		9.5
Δt_2 = Temp. diff. between inner and outer fluids at other end—°F. = 94.5 — 80.7	=		13.8
ΔT = Log mean temp. diff. — deg. F. $= \frac{\Delta t_2 - \Delta t_1}{2.3 \log \frac{\Delta t_2}{\Delta t_1}} = \frac{13.8 - 9.5}{2.3 \log \frac{13.8}{9.5}}$	=		11.55
A = Total area of cooled surface required — sq. ft. $= \frac{\text{B.t.u./hr.}}{\Delta T \times C_t} = \frac{1,332,000}{11.55 \times 246}$	=		469
a = Total area of surface of cooler 1 ft. long — sq. ft. $= N \times M \times \frac{(C_1 + C_2)}{2} = 4 \times 1 \times \frac{(.415 + .459)}{2}$	=		1.748
L = Length of cooler required—ft. $= \frac{A}{a} = \frac{469}{1.748}$	=		268

SPECIAL NOTES:—

(a) In the computation of the "Log Mean Temperature Difference" avoid negative numbers in the numerator, and logs of numbers less than unity by interchange of the Δt_1 and Δt_2 items throughout. In other terms the largest Δt value is to be used as Δt_2 and the smaller as Δt_1.

(b) When $\Delta t_1 = \Delta t_2$ or when the ratio of the largest Δt to the smaller is less than 1.5, use an arithmetic average $\frac{(\Delta t_1 + \Delta t_2)}{2}$ in place of the "Log Mean" value.

(c) In the computation of D_2 note that only the perimeter participating in the heat transfer is used.

(d) As has been noted previously, if the head loss through the apparatus is excessive, choose larger pipe size or add a unit or units in parallel to give lower velocities and make a new calculation.

(e) Additions of cooling surface as a "safety factor" should be made in series, because additions made in parallel will lower the velocities and coefficients.

(f) Note that no "scale factors" have been included in the computation of the total resistance because usual sulphite liquors do not tend to form scale in these cases of exchange of sensible heat. If formation of scale or other fouling is anticipated, a scale factor should be applied.

(g) Refer to standard handbooks for "Coefficients of Thermal Conductivity" for the metals used and interpolate to the proper temperature range. The constants for "stainless" alloys are best obtained from bulletins issued by the manufacturers, since small differences in composition may give rise to large changes in the constants.

efficients were calculated and compared to actual coefficients developed from the same data. The ratios of the theoretical to the actual values are representative of the degree of accuracy that may be expected of the method outlined.

Following are brief descriptions of the four coolers tested with comparisons of the coefficients obtained.

ITEM A

Liquor Cooler at Kimberly, Wis.

This cooler is a part of a SO_2 concentrating system where it serves to cool a liquor containing some 0.54 per cent SO_2. Separate orifice meters were provided for each of the liquids and the separate heat balances figured for each liquor showed a variation of 2.5 per cent. This may have been due in part to heat losses to the room since no corrections were made for the small but appreciable heat loss involved. The apparatus is a double pipe heat exchanger with ten horizontal passes in series, and two series in parallel. The single inner pipe in each unit is a 1.25 inch o.d. by No. 16 Stubs gauge c.n.i. tube, 14.5 feet long with an effective cooled length of 13.6 feet. The total cooled area is 115.3 square feet. The outer jacket is standard 2-inch wrought steel pipe. Following is a summary of the results calculated from the average of 23 sets of observations.

Liquor temperature	deg. F. entering	173.73
" "	leaving	89.64
Water temperature	deg. F. entering	77.7
" "	leaving	112.7
Average B.t.u. per hour	=	1,003,800
Liquor velocity (feet per second)	=	3.88
Water velocity (feet per second)	=	4.33
Theoretical coefficient (Ct)	=	298
Actual coefficient (B.t.u./Hr./Ft.²/°F.)	=	289
$\frac{Ct}{Ca}$ = Ratio	=	1.03

This is believed to be satisfactory for ordinary sulphite work since the data regarding flow rates and temperatures will tend to vary over a wider range and a safety factor of some 15 per cent should be applied in any event.

It will be noted that the velocity values are less than the figure of five feet per second recommended. This was necessary because of pressure limitations.

ITEM B

Bleach Liquor Cooler at Niagara, Wis.

A simple double pipe cooler provided in a bleach liquor preparation system to minimize chlorine losses by cooling of the freshly slacked milk of lime, and by continuous removal of the heat released during the gassing operation. The installation enables use of river water in the process, eliminating the expense and trouble experienced previously in operation of a deep well. It consists of a single series of five vertical passes each constructed with a standard 6 inch wrought steel inner pipe inclosed in a jacket made of standard 8 inch wrought steel pipe. The total cooled area is 117 square feet. Temperatures were taken with mercury-in-glass thermometers. The water flow rate was measured with an orifice and mercury manometer. Twenty-two sets of data were taken and thirteen stable sets were averaged and used in the calculations. The rate of exchange varied from one of 733,000 b.t.u. per hour during the gassing operation to one of 350,000 b.t.u. per hour obtained just before the start of the gassing operation. Liquor velocities approximated 13 feet per second and water velocity was 4.2 feet per second in both periods. A value of (C_t/C_a) of 0.96 was obtained during the gassing operation with a C_t of 284, and the ratio for the period preceding the gassing was 0.97 with a C_t value of 206.

ITEM C

Interprocess Cooler at Niagara, Wis.

This cooler was provided to enable use of river water in place of the well water formerly used during the summer months for the preparation of bisulphite acid in a Paulson milk-of-lime acid tower. This is a second installation.

The first installation was made to replace an ammonia refrigeration system formerly used during the summer months at Kapuskasing, Ontario, Canada, to cool river water for acid plant use. The basic scheme was proposed by Wm. Brubacher, sulphite superintendent, for the Spruce Falls Power and Paper Company, Ltd., during 1928, the specifications were developed by W. H. Swanson, and the installation was made in 1934. Absorption of SO_2 in warm milk-of-lime is satisfactory only so far as to complete the formation of the alkaline-earth bisulphite. Heat is liberated in the formation of the bisulphite and this further limits the solution of SO_2 as sulphurous acid.

The scheme is to withdraw the liquor from the tower at a point where the bisulphite formation has ceased, to pump it through a cooler, and to return it to the final stage of the acid absorption system for fortification with "free SO_2". The original calculations indicated an area of 1,050 square feet. The actual installation consists of horizontal 2 inch i.d. lead pipe within a standard 4 inch wrought steel jacket with a cooled length of 26.5 feet per unit. Nine units are assembled in series, and there are eight banks in parallel, or a total cooled area of some 1,130 square feet. This apparatus has given good service and a similar smaller unit was designed for use at Niagara, Wis. It was found to be preferable to use stainless steel tubes for the Niagara installation. The exchanger consists of fourteen vertical units in series, each unit provided with four 1.75 inch o.d. by No. 14 Stubs gauge, C.N.I. tubes inclosed in a jacket made of standard 6 inch wrought steel pipe. The total cooled area is 409 square feet.

Temperature measurements were made with the thermocouple equipment, and flow rates were measured on the liquor side. Twenty-five sets of observations were taken at two minute intervals in the first series and another series of twenty sets was made the following day under slightly different rate conditions. A summary of the test results is shown in Table II.

TABLE II.—INTERPROCESS COOLER

	Series I	Series II
Liquor temp. (deg. F.) entering.....	99.2	94.5
Liquor temp. (deg. F.) leaving.....	80.8	73.9
Water temp. (deg. F.) entering.....	69.1	64.4
Water temp. (deg. F.) leaving.....	86.5	80.7
B.t.u. per hour	1,000,000	1,332,000
Velocity liquor (feet per second).....	4.27	5.07
Velocity water (feet per second).....	1.92	2.72
Theoretical coefficient (Ct)	222	246
Actual coefficient (Ca)	202	282
Ratio Ct/Ca = ...	1.1	0.87

The average of the two ratios is 0.99. It will be noted that the velocity on the water side is low. This cooler is supplied with filtered cooling water and the warm effluent is used in turn through two other exchangers in series resulting in a build-up of temperature to approximately 140 deg. F. This clean hot water is used in a sulphite pulp bleachery and for a

hot water shower on a pulp drying machine, replacing fresh water and steam used formerly.

ITEM D

Heat Exchanger for Spray Type Burner Gas Cooler.

The gas cooler proper consists of two spray towers, a small concurrent flow tower where the gas is cleaned and cooled to the wet bulb temperature by evaporation of a portion of the spray, and a larger counter-current slat-packed tower which further cools the gas by direct contact. About one-tenth of the hot liquor recovered at the bottom of the second tower is used for the spray in the first tower, the remainder is cooled in a counter-current heat exchanger and returned to the spray nozzle at the top of the second tower for reuse.

The exchanger proper consists of twenty vertical units in series. Each unit consists of three 1.75 inch o.d. by No. 14 Stubs gauge C.N.I. tubes in parallel, and the bundle is jacketed with a standard 5 inch wrought steel pipe. The effective cooled tube length is 16.85 feet to give a total cooled area of 22.1 square feet per unit or 442 square feet total.

Twelve thermometer wells were provided in the return bends and water connectors to allow tests of various portions of the cooler. Flow rates were measured in the hot liquor line entering the cooler. Some 325 separate observations were made, and 143 stable consecutive portions of the data were averaged separately to give the values shown in Table III.

The average ratio of 1.26 is not as good correspondence as was obtained with the three preceding exchangers. This is attributed to two factors, both related to velocity on the water side. The exchanger

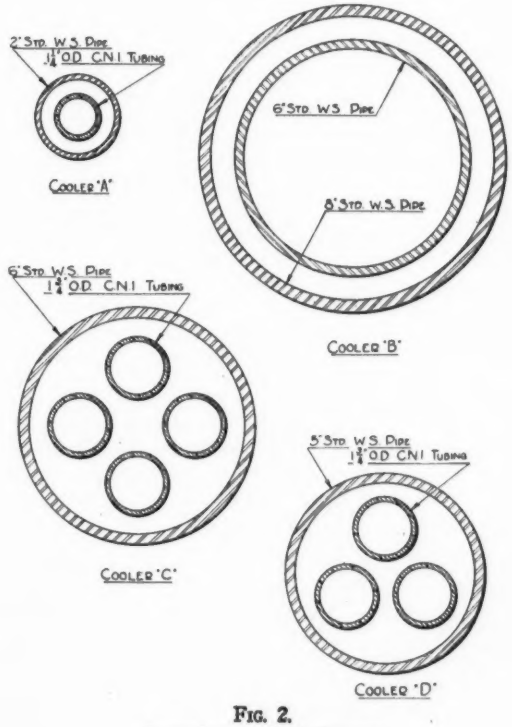

FIG. 2.
Comparison of Fluid Passages

TABLE III.—GAS COOLER HEAT EXCHANGER
(Twenty Passes)

	Series I	Series II
Liquor temp. (deg. F.) entering	123.8	129.2
Liquor temp. (deg. F.) leaving	103.0	107.8
Water temp. (deg. F.) entering	92.0	96.6
Water temp. (deg. F.) leaving	112.0	116.95
B.t.u. per hour	1,277,000	1,306,000
Velocity (feet per second) liquor	6.68	6.62
Velocity (feet per second) water	3.26	3.27
Theoretical coefficient (C_t)	319	324
Actual coefficient (C_a)	257	252
Ratio C_t/C_a	1.24	1.28

was designed for and operated several months at higher water flow rates; but when the "interprocess cooler" (item C), and the "relief cooler" (item E), were placed in operation their additional head losses in series reduced the flow rate through the shell side of this exchanger to the values shown in the table. The second factor is that the effect of low water rate is liable to be more serious than in either of the other designs in that use of three tubes in a common jacket does not give symmetrical water passages and therefore reduces the effective velocity of the water with respect to the inner tube walls. The sketches (Fig. 2) demonstrate the lack of symmetry in this design in comparison to single tube and quadruple tube bundles, and suggests that a considerable improvement might be obtained at the cost of increased head loss, by provision of baffles in the water side.

Similar calculations were made for portions of the cooler with the results as shown in Table IV.

TABLE IV.—GAS COOLER EXCHANGER—VARIOUS PORTIONS

	Series I		Series II	
	C_t	C_t/C_a	C_t	C_t/C_a
2 bundles (44.2 square feet) "cold end"	317	1.08	336	1.11
2 bundles (44.2 square feet) "middle"	325	1.16	324	1.28
2 bundles (44.2 square feet) "hot end"	272	1.25	333	1.33
10 bundles (221 square feet) "cold end"	321	1.17	322	1.24
10 bundles (221 square feet) "hot end"	315	1.24	326	1.37

The lack of correspondence in the ratios for the three different pairs of bundles is attributed to inaccuracies in the temperature measurements. The change in temperature of either fluid through two passes was approximately 2 deg. F. so that extreme accuracy would be required in the measurements. Small errors in the temperature values have a much larger influence upon the actual coefficients than upon the theoretical values, and it will be noted that there is some reduction of the theoretical coefficients from the "cold end" to the "hot end". This suggested that the tubes might have become fouled at the "hot end" of the apparatus, and an inspection revealed the presence of many small particles of sulphur. The deposit was reported to be slight in extent and easily removable, but it may have been responsible for the apparent lowering of the constants observed.

ITEM E

Digester Relief Coolers.

Coolers for digester relief liquors have been calculated by application of the proposed method; but it is not suitable for the design of relief gas coolers. A relief gas cooler serves principally to condense water vapor in the presence of SO_2 and CO_2 gasses, which are non-condensable at the temperature and pressure condition of the service. The SO_2 and CO_2 tend to collect at the surface of the condensate layer to give the effect of an additional gas-film resistance, and the rate of condensation of water vapor is limited by the necessity of diffusion through this gas layer. The reader is referred to "Heat Transmission" by McAdams, Chapter IX, for methods and references.

Tests of a digester relief gas cooler at Kimberly,

Wisconsin, are shown to illustrate the relatively low coefficients obtained in this service. The tests were reported by D. J. McLaurin and Chas. E. Reiley July 1937 in the form of a private "Research Report." The apparatus used consisted of an assembly of twenty-eight vertical C.N.I. tubes 1.25 inchs o.d. by 8 feet cooled length, inclosed in a wrought steel pipe jacket without baffles on the water side.

At the average gas velocity of 38 feet per second the gas temperature leaving the apparatus approximates 200 deg. F. and the overall coefficient was 100 b.t.u. per hour per square foot per degree F.

Average water velocity was 0.64 feet per second. The gas velocity varied from 10 feet per second to a value of 60 feet per second. Within this range the coefficient was found to vary according to the following relationship.

$$C = 19.54\ V_1^{(0.452)}$$

where C = b.t.u. per hour per square foot per degree F.

V_1 = average gas velocity.

Time has not permitted similar tests of another new relief cooler at Niagara, Wisconsin. The new cooler has, however, given good results in practice, replacing an old pond cooler formerly supplied with relatively large volumes of cold water. The cooling water for this new exchanger is the warm water which has been used in series through the "interprocess cooler," and the "burner gas heat exchanger" described in sections (C) and (D). Tube lengths and diameters are the same as for the Kimberly installation. Seventy-three tubes were required by reason of the larger size of the digesters and the shorter blowdown period employed.

ITEM F

SO_2 Burner Gas Cooler—Pond Type.

Refer to "Principles of Chemical Engineering," Walker, Lewis and McAdams, page 148, for a detailed calculation for a conventional pond type burner gas cooler. This method was applied during 1931 to a cooler then existing at Kimberly, Wisconsin, and excellent correspondence was obtained.

Summary

A simplified method is outlined for calculation of heat exchangers involving the case of transfer of sensible heat between two fluids in turbulent flow.

The methods were checked by actual tests of four heat exchangers, and it is believed that the method is suitable for solution of the ordinary problems encountered in pulp mill practice.

References are made to other methods which must be used in the design of coolers for digester relief gasses, and for sulphur burner gasses.

Acknowledgement is given to the operating staffs of the Niagara and the Kimberly sulphite mills for assistance in obtaining the test data, to the Kimberly-Clark Corporation for provision of test equipment and the permission for release of the information and to W. H. Swanson for valuable assistance and guidance.

Isolation of Lignin With Benzyl Alcohol

By Leo Friedman [1] and C. Roland McCully [2]

Abstract

The per cent lignin in western hemlock and white fir has been determined by two methods, the Forest Products Laboratory (2) *and the Willstätter* (1) *procedures.*

Lignin has been isolated from both western hemlock and white fir by the method of Hibbert and Marion (5) *and the method of Phillips* (4).

A new method for the isolation of lignin from wood by using benzyl alcohol has been developed and described. Its chief advantage is that yields obtained approach the theoretical amount of lignin in the wood.

Studies have been made on the methoxyl content of lignin isolated by the Willstätter, Hibbert, and Phillips methods. The methoxyl contents of both the wood residue and the lignin have been made for the benzyl alcohol method.

The problem of obtaining lignin suitable for further investigations has been attacked principally from the standpoint of obtaining a lignin sample as closely related to the native lignin as possible. Little attention has been paid the yield given by the methods of isolation. A good yield is, however, very desirable aside from questions of manipulation, for unless the yield approaches the theoretical the sample obtained cannot be considered as a representative sample of the total lignin. The desirable method of isolation is one which will give a suitable product in good yields. It is believed that the method described in this article approaches the fulfillment of such demands.

Several alcohols have been investigated as solvents for lignin. Benzyl alcohol, being aromatic, should be a good solvent for lignin, which is itself of aromatic nature. This investigation bears out such assumptions. By the use of benzyl alcohol, using hydrochloric acid as an activator, lignin has been dissolved from wood and isolated in amounts which approach theoretical yields. The theoretical amount of lignin which could be isolated was determined by both the Willstätter *(1)* and Forest Products Laboratory *(2)* methods. The lignin samples obtained were completely soluble in pure benzyl alcohol, partially soluble in both 95 per cent ethanol and dilute sodium hydroxide, slightly soluble in methanol, and almost completely soluble in acetone.

Experimental

The woods selected for this investigation were western hemlock *(Tsuga heterophylla)* and white fir *(Abies grandis)*. Sawdust prepared from these woods, after air drying, was ground in a pebble mill until it would pass a 65 mesh screen. This powder was used for all studies.

Semi-quantitative study of the effect of temperature and time of extraction and of the concentration

[1] Department of Chemistry, Oregon State College.
[2] Weyerhaeuser Timber Co., Longview, Wash.

of hydrochloric acid demonstrated that a satisfactory extraction could be made in one hour at 105 deg. C. with HCl concentrations below 4 per cent. The lignin solution in benzyl alcohol was separated from the residue by filtration and the lignin precipitated therefrom by pouring the solution into a large amount of vigorously stirred ether. The lignin formed a precipitate which settled rapidly. On standing, the precipitate became more granular and could be filtered out easily. Table I gives the results of a study made to determine the effect of HCl concentration. The methoxyl values were carried out by a method adapted from that of Clark *(3)*.

It is evident from the results shown in Table I that 3 per cent HCl concentration is most satisfactory for extraction of the lignin. Since the amount of lignin recovered in sample 5, Table I, was less than the theoretically expected quantity (See Table III), the ether filtrate from this sample was concentrated by vacuum distillation and the resulting concentrate poured into 50 cc. of rapidly stirred ether. This procedure yielded a second precipitate of lignin. The results are given in Table II.

TABLE I—BENZYL ALCOHOL EXTRACTION OF WESTERN HEMLOCK

10 cc. BzOH per g. of wood, t = 105 deg. C, time = 1 hour.

		Residue		Lignin	
Sample	HCl, Per cent	Weight, Grams	OCH_3, Per cent	Weight, Grams	OCH_3, Per cent
1	0.1	0.9613	3.96	.....	..
2	0.5	0.8537	3.23	0.0457	6.3
3	1.0	0.7407	3.38	0.1015	8.7
4	2.0	0.5775	2.28	0.1789	9.7
5	3.0	0.4833	0.53	0.2291	9.9
6	4.0	0.5045	1.37	0.2145	9.1

TABLE II.—BENZYL ALCOHOL ISOLATION OF LIGNIN

	Lignin Per cent	Methoxyl Per cent
First lignin precipitation	22.9	9.9
Second lignin precipitation	5.1	8.8
Total lignin precipitation	28.0	9.7

The final method adopted for the isolation of lignin by benzyl alcohol was as follows: Approximately 10 grams of air-dry sawdust (passed 100 mesh) was placed in a tared cotton sack and dried to constant weight in an oven at 105 deg. C. The material was weighed and extracted in a Soxhlet apparatus for 10 hours with a 1 to 2 alcohol-benzene mixture. After pressing out the excess solvent the material was dried in the oven. The dried material was then extracted for 10 hours with water after which it was again dried and weighed. The material was then placed in a 250-cc. Erlenmeyer flask fitted with a short reflux condenser and a stirrer. It was extracted for 1 hour with 100 cc. of pure benzyl alcohol containing 3.0 per cent hydrogen chloride. The flask was heated in a wax bath maintained at 105 deg. C. The solution was filtered hot and the residue washed with 50 cc. of hot benzyl alcohol. After cooling, the filtrate was poured in a fine stream into 2 liters of rapidly stirred ether. The lignin precipitated immediately and settled rapidly when the agitation was stopped. The lignin was allowed to settle for a day in order to facilitate filtering. The clear solution was decanted and the precipitate washed with fresh ether several times before filtering. After filtering and washing with more ether and water the precipitate was dried in a vacuum oven at 50 deg. C. The ether was distilled from the filtrate and the solution further concentrated by distilling off the benzyl alcohol under reduced pressure, heating with a water bath. The residue was poured into ether and the precipitated lignin treated as before.

Discussion of Results

A comparison of the methods of isolating lignin (Table III) shows that with the exception of the two methods for determination, the Forest Products Laboratory and Willstätter methods, the benzyl alcohol method gives much better yields. Both the Forest Products and Willstätter methods have the disadvantage, when it is desired to obtain lignin for further study, of being too severe. The lignin produced in both cases is much less soluble in a number of organic solvents than that produced by milder reagents. The benzyl alcohol method has the advantage of producing a suitable lignin in excellent yields.

TABLE III.—COMPARISON OF METHODS OF ISOLATION

Method of isolation	Per Cent Lignin	
	Fir	Hemlock
1. Willstätter	26.64	28.29
2. Forest products	27.10	29.45
3. Phillips (4)	3.00	3.50
4. Hibbert (5)	5.00	5.00
5. Benzyl alcohol	25.00	28.00

The per cent methoxyl of the benzyl alcohol lignin (Table IV) is slightly lower than the other lignin samples. With the exception of the Willstätter method, however, the total per cent of methoxyl recovered is much larger because of the greater yield of lignin.

TABLE IV.—COMPARISON OF METHODS OF ISOLATION.

Method of isolation	Per cent Methoxyl in lignin	
	Fir	Hemlock
1. Willstätter	14.6	13.8
2. Hibbert	12.3	11.3
3. Phillips	11.6	10.6
4. Benzyl alcohol	11.1	9.9
5. Methoxyl in the original wood	4.8	4.4

The ease of manipulation can also be considered in favor of the benzyl alcohol method. The lignin extraction requires only one hour and one extraction as compared to the several hours required by the other methods investigated. The precipitated lignin filtered easily giving a light powder. The lignin isolated by the method of Hibbert required several reprecipitations before filtering and at best gave a gelatinous precipitate.

Literature Cited

(1) Ritter, G. J., Seborg, R. M. and Mitchell, R. L. *Ind. Eng. Chem., Anal. Ed.*, 4: 202-4 (1932).
(2) Billington, P. S., Simmonds, F. A., and Baird, P. K., *Paper Trade J.* 96, No. 4: 30-3 (1933).
(3) Clark, E. P., *J. Am. Chem. Soc.*, 51: 1495-8 (1929).
(4) Phillips, M., *J. Am. Chem. Soc.* 49: 2037-40 (1927).
(5) Hibbert H., and Marion, L., *Can. J. Research* 2: 364-75 (1930).

First Barge of Pulpwood up Trinity

According to a report from Fort Worth, Texas, the tug Louise made commercial history on the Trinity River recently when it hauled the first barge load of pulpwood from the Trinity basin through Galveston Bay, up the Houston Ship Channel and to the Champion Paper and Fiber Company located at Pasadena.

This is the first load of pulpwood to this mill from up the Trinity, but not the last by any means. Capt. Eddy Lotz of the Louise is under contract to deliver 800 cords a month to the mill for five years.

A picture of the vast resources for paper mills from the Trinity Valley can be glimpsed from the fact that this mill has available an estimated 90,000,000 cords annually which it can transform into paper. Because new plantings of pine are to go in as the timber is cut, this resource, a new source of wealth from the Trinity Valley, will be without end.

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C. for 10 cents each. Send currency, not stamps.

Mechanical Process

Experiments with Lignasan Treatment of Mechanical Pulp. E. Rennerfelt. Svensk Pappersmasse-Tidn. 14:506-508(1937); B. I. P. C. 8:333.—Lignasan (ethyl mercuric chloride) was found effective in combating blue stain of wood bolts; a laboratory study was therefore undertaken in an effort to inhibit fungal growth of groundwood pulp. The effect of length of treatment and temperature was investigated. Lignasan kills diaspores of blue stain very rapidly. In concentrations of 0.005 per cent of Lignasan the stock is sterile within 5 minutes. As the spore concentration increases, Lignasan becomes less effective. The fungus *Cladosporium herbarum* (which is less widely distributed in mechanical pulps than *Pullularia pullulans*) is also more resistant than is the latter. With increasing temperature the spore resistance towards Lignasan decreases. The satisfactory lab. experiments could not be duplicated in mill practice. While there was a very definite decrease in the number of spores, the stock could not be rendered sterile, even when powdered lignasan was added to the pulp. Lignasan causes no odor or coloration in the pulp. The author ascribes the failure of the application of Lignasan in practice to uneven distribution in the stock. It is still a moot question, however, whether the use of the toxic agent could be made commercially profitable.—C.J.W.

Foam Formation with Ground Wood from Pine. Wochbl. Papierfabr. 69, no. 1:14; no. 4:80; no. 5:101; no. 6:120 (Jan. 1, 22, 29, Feb. 5, 1938); B. I. P. C. 8:332.—The inquirer experiences considerable trouble on the paper machine when using mechanical pulp produced from pine. The showers no longer suffice for its suppression and the large quantities of damps formed in the machine room are very troublesome. How can foam formation be prevented or at least be greatly reduced and the objectionable vapors removed in a simple manner? Foaming of pine pulp can be reduced by using only well seasoned wood, grinding to a slow pulp at low pressures and with addition of fresh water, avoiding strong currents, eddies, and violent mechanical agitation in knotters, rifflers, pumps, etc. Foam preventatives such as kerosene, glycerin, different kinds of vegetable oils, skim milk, Spumex, etc., can be added at different points (rifflers, beaters, or paper machine). Other suggestions are to grind in a slightly alkaline medium or to add alum to the riffler to make the pulp slightly acid. In the case of steamed groundwood a shorter cooking period, discharging the first liquor, filling the digester with fresh water, and letting stand for 3-4 hours under pressure may be helpful. Not much can be done with the damps except exhausting them through a suction fan into the open.—C.J.W.

The Perforation of Mechanical Pulp. Wochbl. Papierfabr. 69, no. 8:160; no. 12:262 (Feb. 19, March 19, 1938).—[In German]. The groundwood pulp leaves the dewatering machine with a dry content of approximately 32 per cent, is folded into packages, 4 sheets in thickness, which are pressed in hydraulic presses to about 50-52 per cent dry content; the pressed packages are about 6 cm. thick, corresponding to 12 sheets. The pulp is destined for sale across the border and must be perforated. The mill seeks information with regard to a convenient and simple method, as well as to the manufacturing phase during which the perforations can most suitably be applied. In Kamyr machines working with endless webs special perforating rolls are provided; these, however, cannot be used in the present case. It will be necessary to use simple punching machines, such as every manufacturer of papermaking machinery can supply, after the pulp leaves the hydraulic presses. One answer suggests fixing small cork disks upon the wire of the cylinder mold at certain intervals; this will suffice to produce the perforations required by the custom offices.—C.J.W.

Miscellaneous Pulping Processes

Pulping Process. Henry Dreyfus. U. S. pat. 2,110,545 (March 8, 1938).—Wood is treated with a 2 per cent to 10 per cent aqueous nitric acid solution at a temperature below 95°C., and is then subjected to a two-stage treatment with alkali, the first stage with a hot weak solution (about 2.5 per cent) and the second with a cold strong solution (about 15 per cent). (Cl. 92-9).—A.P.-C.

Pulping Process. Henry Dreyfus. U. S. pat. 2,110,546 (March 8, 1938).—Wood is treated in a digester with steam at a temperature of 128°C. under a pressure of 25 lbs. per sq. in. for about 1 hr. It is then subjected for about 8 hrs. at 80°C. to the action of 7 per cent nitric acid in an amount of about 10 times the dry weight of the wood. The material is washed free from acid and is finally boiled for 1 hr. with a 3 per cent solution of caustic soda. (Cl. 92-9).—A.P.-C.

Production of Cellulose from Lignocellulosic Materials. Henry Dreyfus. U. S. pat. 2,106,797, (Feb. 1, 1938).—A solvent composition such as alcohol solution, etc., capable of dissolving lignin from lignocellulosic material, is brought into contact at high temperature (suitable about 100° to 250°C.) and caused to flow through initial material such as wood to dissolve lignin, and the solution formed is removed from the material after a time of not more than 20 min., and fresh solvent is applied. (Cl. 92-9).—A.P.-C.

Beating

Studies on Mitsumata. VI. Factors affecting the determination of beating degree. Hisao Imai and Yasokichi Kasiwabara. Research Bull. Govt. Printing Bureau Tokio 1937, no. 4:1-9; C. A. 32:3609.—The effect of water temperature, *p*H, consistency and quantity of filler or leading material (clay) present, upon the degree of beating (Schopper-Riegler values) of a Mitsumata pulp were determined, conditions being held constant in any given experiment. The higher the temperature of the water the less the degree of beating, the obtainable maximum being much lower at higher temperatures, e.g., maximum at 15° C. being 80° S. R. and at 50° C., about 60° S. R. Increasing the consistency increased the degree of beating. The values were remarkably higher at higher

consistencies, e.g., a pulp showing minimum and maximum values of 8° and 46° S. R. at 0.05 consistency gave 34° and 88° S. R. at 0.4 per cent. Beating effects differed, however, as to wetting or hydration and free cutting for the stocks at equal S. R. values owing to the consistency effect. The maximum beating effect was noted when the *p*H of the water was at a value of 5-7. The greater the quantity of clay filler the higher is the beating degree, this being a maximum at 40-50° S. R.—C.J.W.

Method of and Apparatus for Agitating Pulp Stock. John A. Rosmait. U. S. pat. 2,107,390, (Feb. 8, 1938).—The storage chest has a conical bottom, at the apex of which is located the intake pipe of the circulating pump. A dome-shaped baffle is provided inside the chest and spaced slightly above the bottom; it covers a substantial portion of the sloping bottom and the edge being nearer the outer edge than the center of the bottom of the tank. The pulp is delivered by the pump into the upper portion of the tank, through a flaring discharge spout, into which is also discharged fresh stock being fed into the tank. (Cl. 92-37).—A.P.-C.

Hydrator. Carlton H. Allen. U. S. pat. 2,092,628 (Sept. 7, 1937).—The apparatus consists of a circular casing having alternative internal gears and smooth surfaces longitudinally thereof. A generally cylindrical member is mounted axially in the casing and is provided with alternate gears and smooth surfaces facing the gears and smooth surfaces of the casing. The casing and cylindrical member are rotatable relatively to each other. Planetary gears engage the gear teeth of the casing and of the cylindrical member, and the planetary gears are provided with rollers engaging the smooth surfaces of the casing and of the cylindrical members and at least partially overlie the sides of the teeth of the planetary gears, thus forming pockets in which stock is successively entrapped and extruded by the action of the entering teeth.—(Cl. 92-96).—A.P.-C.

Process of Making Linings for Jordan Engine Shells. Harold D. Stuck and Philip A. De Nault, assignors to John W. Bolton & Sons, Inc. U. S. pat. 2,103,344, (Dec. 28, 1937).—The invention provides for applying great pressure which may be of the hydraulic type, along substantially the entire length of successive assemblies of knives and separators. This pressure may be applied and the parts may be assembled without the use of a jig, form or mould. Preferably, after each successive group is assembled, the parts are locked against displacement in service. —(Cl. 92-97).—A.P.-C.

Apparatus for Treating Material. Joseph W. Boles, assignor to Electro-Fibre Corp. U. S. pat. 2,087,870, (July 20, 1937).—The object of the invention is to provide an improved method and apparatus for generating high-speed frictional effects, of possibly electrostatic or electrochemical character. The apparatus may be constructed by modifying the beater by removing the knives in the bedplate and substituting for them plates made of soft steel or other magnetic material; the knives of the beater rolls are replaced by bars and separating elements. The tank, associated equipment and motor are all mounted so as to be completely insulated. The plates in the floor of the beater are permanently magnetized, and the bars in the roll are temporarily magnetizable.—(Cl. 92-24).—A.P.-C.

Bleaching

Bleaching Department at O. Y. Rauma Wood Ltd. Ilmari Koskinen. Finnish Paper and Timber J. 20, no. 5:186, 188-190, 192-193 (March 15, 1938); B. I. P. C. 8:322.—An illustrated description of the new sulphite pulp bleaching plant with a capacity of 25,000 tons per year is given. The bleaching process developed by the International Bleaching Corporation has been chosen.—C.J.W.

Bleaching Cellulosic Materials. Maurice C. Taylor and James F. White, assignors to The Mathieson Alkali Works, Inc. U. S. pat. 2,100,496, (Nov. 30, 1937).—Pulp is subjected to an initial treatment with chlorine or hypochlorite. The treatment is stopped before there has been any appreciable destructive action on the fiber, and bleaching is completed by means of chlorous acid or a chlorite at a pH value of 3.5 to 5.0 and 50° to 90°C. (Cl. 8-2).—A.P.-C.

Bleaching Pulp. John A. Extrom, assignor to Tomahawk Krapt Paper Company and Hoke Martin, assignor to Mathieson Alkali Works, Inc. U. S. pat. 2,101,706, (Dec. 7, 1938).—Lime is added continuously to the pulp while chlorine is being added, the pH being maintained between about 4 and 8. (Cl. 8-2)—A.P.-C.

Sizing

Chemistry of Paper Sizing in the Pulp with Rosin Size. G. E. Shnyparkov. Bumazhnaya Prom. 15, no. 9:24-32 (1937); C. A. 32:3957.—The mechanism of the fixation of rosin colloid on fiber by the action of aluminum sulphate in the sizing of paper in the pulp was studied. Since copper sulphate acts similarly to aluminum sulphate as a size agglutinant and gives characteristically colored hydrates, it was substituted for aluminum sulphate as a means for elucidating the effect of the degree of aluminum (copper) hydration on the sizing process. A 100 per cent bleached sulphite pulp was sized with 3 per cent of white size (22 per cent free rosin) and 5 per cent aluminum sulphate and 5 per cent copper sulphate at 18-20° and *p*H 3 and 6. The degree of sizing of the hand made paper was tested by the streak method. To study the relative adsorptive processes the pulp was treated alone and in various combinations with aqueous suspensions of powdered rosin, cupric hydrate, aluminum hydroxide and their lower hydroxides and with solutions of cupric sulphate, aluminum sulphate, sodium chloride and sodium sulphate. The adsorption was tested by analyzing the filtrate and the pulp. Good sizing resulted at *p*H 6 with aluminum hydroxide as the chief reaction product and not at all at *p*H 3 in the presence of aluminum ions. Because of the capillary inactivity, sodium chloride and sulphate and aluminum sulphate are not adsorbed by pulp from neutral solutions, while aqueous rosin and resinate alone are easily adsorbed (7.2 per cent). Likewise divalent copper and trivalent aluminum ions are incapable of rosin fixation on cellulose, because they are not adsorbed by pulp and cannot adsorb dispersed rosin. The adsorption of cupric hydroxide and aluminum hydroxide by pulp and rosin decreases sharply by boiling (dehydration). Though the strong positive charge of aluminum hydroxide probably is not affected by boiling, no sizing of paper takes place because of the electrostatic attraction of the unlikely charged particles of rosin and cellulose on one hand and aluminum hydrate on the other. It follows that the electrostatic attraction between cellulose, lower aluminum hydrate and rosin is not a factor in the sizing of paper. It is considered that the sizing of paper in the pulp with rosin size is effected by a

stable adsorptive combination of aluminum hydroxide on the surface of cellulose by means of the residual valencies (dipoles) and by a chemical reaction of aluminum hydroxide with resinate extending over the surface of rosin globules. The chemical reaction on the surface of dispersed rosin is completed on the drying rolls. In paper sizing the formation of the adsorption compound is accompanied by secondary reactions with the formation of undesirable aluminum resinates. These compounds do not react with cellulose on the fiber surface by means of secondary valencies but are chiefly retained mechanically as fillers. A part of the aluminum resinate retained in the paper capillaries produces a positive effect on sizing. The loss of aluminum hydroxide because of the excessive formation of aluminum resinate can be obviated by sizing with Bewoit size with 90-95 per cent free rosin instead of white size containing up to 70 per cent of sodium resinate. In drying paper the optimum initial temperature is 60-65°; at higher temperatures (85-100°) the sizing effect decreases because of the rupture of the dipolar bond and the restoration of the activity (polarity) of cellulose hydroxyl groups, which is a result of the formation of stable chemical compounds of aluminum resinate and hydroxide with the separation of poorly dissociated water molecules. At higher temperatures the entire aluminum hydroxide reacts with resin acids and is transformed into lower aluminum hydrates. In the final stage of drying at the optimum temperature of 130-135°, the sizing of paper predried at 60° is considerably improved, while that of paper predried at 85-95° remains unchanged.—C.J.W.

Interaction of Cellulose and Aluminum Compounds. Ya. G. Khinchin. Bumazhnaya Prom. 15, no. 9:15-23 (1937); C. A. 32:2953.—From a critical review of the publications of Khinchin and other investigators on the processes involved in the sizing of paper it is tentatively concluded that cellulose is not an amphoteric substance. The apparent amphoteric properties of paper are traced to impurities (solid acids, insoluble salts, etc.) and the substances adsorbed in the processing (aluminum in sizing, etc.). Aluminum is chiefly adsorbed by the double decomposition of the impurities (calcium salts of organic acids) and aluminum sulphate with separation of aluminum hydroxide. This process proceeds in solutions at about pH 4.5 to 5 and is retarded at lower pH and completely inhibited at higher values. A small amount of aluminum is directly adsorbed by paper from aluminum sulphate solutions. The rate of direct absorption decreases with decreasing pH of the solution and is completely checked by the addition of an acid because of the arrested hydrolysis of aluminum sulphate. The direct adsorption of aluminum hydroxide from the sulphate solution is influenced by the paper swelling, which in turn is determined by the content of pentosans and the methods of processing (beating, drying, etc.). The adsorption is also affected by the addition of animal glue. In general, paper absorbs considerably more aluminum from a solution of basic aluminum sulphate than from the neutral salt.—C.J.W.

Carbonate-Filled Sized Paper. James C. Schmidt, assignor to E. I. du Pont de Nemours & Co. U. S. pat. 2,109,931, (March 1, 1938).—An aqueous emulsion, dispersion or solution of water-resistant sizing material is incorporated into paper pulp, and an acidic precipitation is added to set the water-resistant substance on the fibers. The acidity of the pulp is neutralized by addition of an alkali that does not liberate carbon dioxide on reaction with an acid. The pulp is then mixed with a calcium carbonate slurry that has been treated with a water resistant substance insensitive to the alkalinity of calcium carbonate. The stock is then formed into paper in known manner. (C1.92-21).—A.P.-C.

Sized Paper. Johan Oltmans. U. S. pat. 2,105,-052, (Jan. 11, 1938).—Sized paper is made containing up to 5 per cent of a cold swelling starch. The latter is made by subjecting 1 part of raw starch with 0.5 to 2.0 parts of water to heat and pressure sufficient to effect gelatinization and to burst the starch granules and form cold swelling starch granules of substantially larger size than the granules of the raw starch, the cold-swelling starch being present as an irreversible colloid little affected by moisture and temperature changes. The paper thus prepared is resilient, has high folding, Mullen and tearing strength and is nonpicking when printed. (C1.92-21).—A.P.-C.

Paper Sizing. Louis L. Larson, assignor to E. I. du Pont de Nemours & Co. U. S. pat. 2,109,944, (March 1, 1938).—Oil-plasticized resin is dissolved in a volatile organic solvent, the solution is emulsified with water and an emulsifying agent and is homogenized until the resin is contained in the finely divided state obtainable by homogenization in a colloid mill. The emulsion is added to a water slurry of calcium carbonate and the resin is precipitated on the calcium carbonate. The sized calcium carbonate is added to unsized paper stock which is made into paper in known manner. (C1.92-21).—A.P.-C.

Paper Manufacture. Henry P. Carruth, assignor to K. C. M. Co. U. S. pat. 2,111,089, (March 15, 1938).—A substantially unfilled sheet is formed on the wire of a paper machine, and filler is then added to the wire side of the wet web. (C1.92-40).—A.P.-C.

Drying

Yankee Machine. Wochbl. Papierfabr. 69, no. 7: 138; no. 9: 183; no. 10: 211; no. 11: 241 (Feb. 12, 26, March 5, 12, 1938), B.I.P.C. 8: 339.—The inquirer asks whether it would be advisable to install a second press into a machine equipped with a Yankee dryer of 1500 mm. diameter, so that the paper web is twice pressed against a hot drying surface, both times by means of the same top felt. Figures for higher power consumption and eventual higher output are also asked for. Most answers advise against such an installation; increase in production can be obtained in a better way by increasing the diameter of the Yankee dryer to 2000 or 2500 mm. or installing a hot air ventilating system.

Apparatus for Discharging Condensate from Drying Drums. William S. Allen. U. S. pat. 2,102,-106, (Dec. 14, 1937).—In low-temperature steam driers (e.g., rayon driers) in order to ensure sufficient pressure in the cylinder to discharge the condensate through the siphon pipe, a constant air pressure is maintained within the drier, suitably by connecting an air pipe through a suitable reducing valve to the steam line between the thermostatically controlled steam valve and the drier. (C1.34-48)—A.P.-C.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING DECEMBER 24, 1938

SUMMARY

Cigarette paper .....1,350 cs.
Wall paper.....34 cs.
Paper hangings.....14 bls., 1 cs.
Painted paper.....14 bls.
Newsprint.....9,313 rolls
Printing paper.....57 bls., 1 cs.
Kraft paper.....1 roll
Wrapping paper.....1,347 rolls, 904 bls.
Drawing paper.....1 cs.
Filter paper.....10 cs.
Bristol boards .....2 cs.
Surface baryta coated paper .....94 cs.
Surface coated paper .....107 cs.
Decalcomanias.....12 cs.
Transfer pictures.....11 cs.
Tissue paper.....5 bbls., 28 cs.
Tracing cloth.....22 cs.
Miscellaneous paper.....122 bls., 30 cs.

CIGARETTE PAPER

Champagne Paper Corp., *West Cusseta,* Havre, 555 cs.
Champagne Paper Corp., *Fort de France,* Havre, 370 cs.
Braunstein Freres, Inc., *Fort de France,* Havre, 23 cs.
Braunstein Freres, Inc., *American Farmer,* Havre, 18 cs.
Braunstein Freres, Inc., *Champlain,* Havre, 18 cs.
Champagne Paper Corp., *Champlain,* Havre, 181 cs.
De Manduit Paper Corp., *Champlain,* Havre, 4 cs.
———, *Normandie,* Havre, 181 cs.

WALL PAPER

———, *Europa,* Bremen, 34 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Farmer,* London, 1 cs.,14 bls.

PAINTED PAPER

———, *Fort de France,* Havre, 14 bls.

NEWSPRINT

News Syndicate Co., Inc., *Louisianan,* Comeau Bay, 6,503 rolls.
Lunham & Reeve, Inc., *Scanpenn,* Kotka, 140 rolls.
Jay Madden Corp., *Scanpenn,* Kotka, 683 rolls.
———,*Oslofjord,* Skien, 184 rolls.
Jay Madden Corp., *Manhattan,* Finland, 406 rolls.
N. Y. Evening Journal, *Manhattan* Finland, 258 rolls.
Walker Goulard Plehn Co., *Mormacport,* Wiborg, 41 rolls.
H. Reeve Angel & Co., Inc., *Mormacport,* Wiborg, 37 rolls.
Jay Madden Corp., *Mormacport,* Wiborg, 1,061 rolls.

PRINTING PAPER

Wilkinson Bros., Inc., *Oslofjord,* Oslo, 57 bls.
F. L. Kramer & Co., *Ausonia,* London, 1 cs.

KRAFT PAPER

Parsons & Whittemore, Inc., *Brahcholm,* Gothenburg, 1 roll.

WRAPPING PAPER

Jay Madden Corp., *Manhattan,* Finland, 1,347 rolls, 904 bls.

DRAWING PAPER

H. Reeve Angel & Co., Inc., *American Farmer,* London, 1 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., *American Farmer,* London, 10 cs.

BRISTOL BOARDS

Keuffel & Esser Co., *American Farmer,* London, 2 cs.

SURFACE BARYTA COATED PAPER

Dingelstedt & Co., *Westernland,* Antwerp, 94 cs.

SURFACE COATED PAPER

Gevaert Co., of America, *Black Eagle,* Antwerp, 21 cs.
Gevaert Co., of America, *Westernland,* Antwerp, 79 cs.
L. A. Consmiller, *Europa,* Bremen, 5 cs.
J. E. Mandlik, *Europa,* Bremen, 2 cs. (white).

DECALCOMANIAS

L. A. Consmiller, *Europa,* Bremen, 7 cs.
Sellers Transportation Co., *Europa,* Bremen, 5 cs.

TRANSFER PICTURES

Rohner Gehrig & Co., *Europa,* Bremen, 11 cs.

TISSUE PAPER

Dingelstedt & Co., *American Traveler,* Liverpool, 8 cs.
Jay Madden Corp., *Scanpenn,* Helsingofrs, 5 bbls., 20 cs.

TRACING CLOTH

E. Dietzgen & Co., *Laconia,* Liverpool, 22 cs.

MISCELLANEOUS PAPER

H. Reeve Angel & Co., Inc., *Braheholm,* Gothenburg, 7 cs.
H. Reeve Angel & Co., Inc., *Fort de France,* Havre, 60 bls., 23 cs.
A. Giese & Son, *Fort de France,* Havre, 62 bls.

RAGS, BAGGINGS, ETC.

National City Bank, *Ilsenstein,* Antwerp, 60 bls. rayon waste.
Manufacturers Trust Co., *Ilsenstein,* Antwerp, 17 bls. rags.
Darmstadt Scott & Courtney, *Black Eagle,* Antwerp, 170 bls. bagging.
———, *Examiner,* Lisbon, 144 bls. bagging.
Castle & Overton, Inc., *West Cusseta,* Dunkirk, 5 bls. linen rags.
D. Benedetto, Inc., *West Cusseta,* Havre, 279 bls. bagging.
———, *Transylvania,* Glasgow, 11 bls. paper stock.
Irving Trust Co., *American Traveler,* Liverpool, 494 bags old pickers.
Manufacturers Trust Co., *American Traveler,* Liverpool, 40 bls. rags.
———, *American Traveler,* Liverpool, 6 bls. rags.
J. Cohen & Sons, Co., Inc., *Robert Maersk,* London, 8 bls. rags.
———, *Robert Maersk,* London, 14 bls. waste paper.
D. M. Hicks, Inc., *Robert Maersk,* Rotterdam, 142 bls. bagging.
D. Benedetto, Inc., *Robert Maersk,* Antwerp, 19 bls. rags.
Darmstadt Scott & Courtney, *Veendam,* Rotterdam, 114 bls. bagging.
Castle & Overton, Inc., *City of Flint,* Dundee, 117 bls. paper stock.
Chase National Bank, *City of Flint,* Dundee, 164 bls. paper stock.
H. G. Lichtenstein, *Exochorda,* Haifa, 62 bls. rags.
Irving Trust Co., *Exochorda,* Alexandria, 62 bls. bagging.
W. J. Green, *Exochorda,* Alexandria, 131 bls. rags.
———, *Exochorda,* Alexandria, 70 bls. rags, 90 bls. bagging.
Castle & Overton, Inc., *Exochorda,* Alexandria, 87 bls. bagging.

HIDE GLUE

———, *Roma,* Trieste, 350 bags hide glue.

OLD ROPE

W. Steck & Co., *Gitano,* Hull, 51 coils.
National City Bank, *Westernland,* Antwerp, 108 coils.
Irving Trust Co., *Black Hawk,* Rotterdam, 70 coils.
National City Bank, *City of Flint,* Leith, 78 coils.

CASEIN

———, *Southern Prince,* Buenos Ayres, 100 bags.
National City Bank, *Normandie,* Havre, 267 bags.

WOOD PULP

Pulp Sales Corp., *Brahcholm,* Kemi, 1410 bls. sulphate.
Pulp Sales Corp., *Brahcholm,* Oulus, 1,020 bls. sulphate.
Pulp Sales Corp., *Braheholm,* Jakobstad, 3,115 bls. sulphite.
Pagel Horton & Co., Inc., *Braheholm,* Gefle, 1,000 bls. sulphite.
Perkins Goodwin & Co., *Brahcholm,* Gothenburg, 150 bls. sulphite, 300 bls. sulphate.
D. M. Hicks, Inc., *Braheholm,* Gothenburg, 450 bls. sulphite.

Bulkley Dunton Pulp Co., Inc., *Braheholm,* ———, 500 bls. sulphite.
Johaneson Wales & Sparre, Inc., *Ivar,* Talinin, 3,050 bls. sulphate, 509 tons.
———, *Ivar,* Talinin, 320 bls. sulphate, 53 tons.
Pulp Sales Corp., *Scanpenn,* Kotka, 330 bls. sulphate, 55 tons.
Chase National Bank, *Oslofjord,* Oslo, 450 bls. sulphite.
———, *Oslofjord,* Oslo, 500 bls. chemical pulp.
E. M. Sergeant Pulp & Chemical Co., *Oslofjord,* Nygard, 125 bls. chemical pulp.
Absorbo Beer Pad Co., *Roma,* Trieste, 406 bls. wood pulp.
Pulp Sales Corp., *Mormacport,* Wiborg, 1,450 bls. sulphate, 290 tons.
Pulp Sales Corp., *Lagaholm,* Rauma, 2,746 bls. sulphite.
Lagerloef Trading Co., *Lagaholm,* Rauma, 725 bls. mechanically ground pulp.
Stora Kopparberg Corp., *Lagaholm,* Skutskar, 760 bls. dry pulp.
Pagel Horton & Co., Inc., *Lagaholm,* Skutskar, 4,125 bls. wood pulp.
———, *Lagaholm,* Iggesund, 1,775 bls. sulphate.
Gottesman & Co., Inc., *Kungsholm,* Gothenburg, 181 bls. wood pulp.

WOOD PULP BOARDS

Jay Madden Corp., *Scanpenn,* Wiborg, 81 bls.
———, *Scanpenn,* Wiborg, 5 rolls.

NEWARK IMPORTS

WEEK ENDING DECEMBER 24, 1938

———, *Jan,* Sheet Harbor, N. S., 2,179 bls. ground wood pulp, 59 bls. wood pulp screenings.

ALBANY IMPORTS

WEEK ENDING DECEMBER 24, 1938

Halifax Power & Pulp Co., *Jan,* Sheet Harbor, N. S., 8,539 bls. ground wood pulp.
Atterbury Bros., Inc., *Taiwan,* Tofte, 3,600 bls. sulphite.
The Borregaard Co., Inc., *Taiwan,* Tofte, 300 bls. sulphate.
Atterbury Bros., Inc., *Taiwan,* Drammen, 6,000 bls. chemical pulp.
———, *Taiwan,* Drammen, 500 bls. sulphite.
Atterbury Bros., Inc., *Taiwan,* Greaker, 525 bls. chemical pulp.
———, *Taiwan,* Greaker, 2,750 bls. sulphite.

PORTLAND IMPORTS

WEEK ENDING DECEMBER 24, 1938

Pagel Horton & Co., Inc., *Blankaholm,* Sweden, 2,400 bls. wood pulp.
Gottesman & Co., Inc., *Blankaholm,* Sweden, 1,910 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING DECEMBER 24, 1938

E. J. Keller Co., Inc., *Black Hawk,* ———, 348 bls. rags.
———, *Black Hawk,* Rotterdam, 88 bls. rags.
———, *Black Hawk,* Antwerp, 115 bls. rags, 18 bls. thread waste, 21 cs. wrapping paper.
Irving Trust Co., *Black Hawk,* Antwerp, 54 bls. bagging.
Price & Pierce, Ltd., *Braheholm,* ———, 1,200 bls. bleached sulphite.
Parsons & Whittemore, Inc., *Mathilde Thorden,* ———, 2,700 bls. wood pulp.
Pagel Horton & Co., Inc., *Lagholm,* Sweden, 1,075 bls. wood pulp.

NEW LONDON IMPORTS

WEEK ENDING DECEMBER 24, 1938

Gottesman & Co., Inc., *Bockenheim,* Sweden, 750 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING DECEMBER 24, 1938

D. Benedetto, Inc., *West Cusseta,* Havre, 49 bls. bagging.
D. Benedetto, Inc., *West Cusseta,* Dunkirk, 56 bls. bagging.
F. Whitaker Co., *West Cusseta,* Dunkirk, 50 bls. jute threads.
Gottesman & Co., Inc., *Scanpenn,* Stockholm, 1,500 bls. sulphite, 152 tons.
J. W. Hampton Jr., & Co., *Scanpenn,* Kotka, 280 rolls newsprint.
Pulp Sales Corp., *Scanpenn,* Kotka, 430 bls. sulphite, 78 tons.
Jay Madden Corp., *Scanpenn,* Wiborg, 7 bls. wood pulp boards.
Neidich Process Co., *Scanpenn,* Helsingfors, 19 bbls. tissue paper.
———, *City of Flint,* Dundee, 172 bls. paper stock.
———, *City of Flint,* Leith, 30 bls. new cuttings.
J. W. Hampton Jr., & Co., *Mormacport,* Wiborg, 86 rolls newsprint.
Jay Madden Corp., *Mormacport,* Wiborg, 15 rolls newsprint.
Pulp Sales Corp., *Mormacport,* Wiborg, 1,016 bls. sulphite, 193 tons.
Gottesman & Co., Inc., *Heddernhiem,* Sweden, 3,055 bls. wood pulp.

WILMINGTON IMPORTS

WEEK ENDING DECEMBER 24, 1938

Castle & Overton, Inc., *Mormacport,* Wiborg, 3,472 bls. wood pulp, 693 tons.
Jay Madden Corp., *Mormacport,* Wiborg, 1141 rolls wood pulp boards, 133 tons.
Pulp Sales Corp., *Mormacport,* Helsingfors, 4,681 bls. sulphite, 795 tons.
Pulp Sales Corp., *Mormacport,* Helsingfors, 160 bls. mechanically ground pulp, 32 tons.
Bulkley Dunton Pulp Co., Inc., *Mormacport,* ———, 300 bls. sulphite, 50 tons.

BALTIMORE IMPORTS

WEEK ENDING DECEMBER 24, 1938

Bulkley Dunton Pulp Co., Inc., *Ivar,* ———, 4,716 bls. mechanical pulp, 786 tons.
———, *Ivar,* Tallinin, 160 bls. sulphate, 26 tons.
Johaneson Wales & Sparre, Inc., *Ivar,* Tallinin, 2420 bls. sulphate, 404 tons.
———, *Ivar,* Tallinin, 320 bls. sulphate, 53 tons.
Pulp Sales Corp., *Scanpenn,* Kotka, 348 bls. sulphate, 58 tons, 3,048 bls. mechanically ground pulp, 609 tons.
Pulp Sales Corp., *Scanpenn,* Wiborg, 4,089 bls. sulphite, 817 tons.
Castle & Overton, Inc., *Scanpenn,* Wiborg, 512 bls. wood pulp, 102 tons.
———, *City of Flint,* London, 62 coils, 41 bls. old rope.
Parsons & Whittemore, Inc., *Mathilde Thorden,* ———, 4,650 bls. wood pulp.
Pagel Horton & Co., Inc., *Heddernheim,* Sweden, 4,875 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING DECEMBER 24, 1938

———, *Ivar,* Gothenburg, 175 bls. wood pulp, 35 tons.
Gottesman & Co., Inc., *Ivar,* Gothenburg, 2,875 bls. wood pulp, 583 tons.
Pagel Horton & Co., Inc., *Taiwan,* Heroen, 37 rolls newsprint.
The Borregaard Co., Inc., *Taiwan,* Heroen, 1,800 bls. sulphate.
Atterbury Bros., Inc., *Taiwan,* Tofte, 900 bls. sulphite.
Atterbury Bros., Inc., *Taiwan,* Drammen, 4,000 bls. chemical pulp.
Gottesman & Co., Inc., *Heddernheim,* Sweden, 7,000 bls. wood pulp.

Standardizing Hand-Made Papermaking

WASHINGTON, D. C., December 28, 1938.—The investigations started some months ago by the Department of Industries, Bengal, India, have resulted in the formulation of a standardized scheme for the production of hand-made paper, according to reports from the office of the American Trade Commissioner, Calcutta. By this method it has been found possible to utilize raw materials such as jute stalk, paddy straw, leaves of certain plants, etc., for the production of pulp in place of the expensive chemicals and sizing and finishing materials which have hitherto been considered indispensable for paper making. It is said that by the new method, the cost of production is reduced by about 50 per cent. The Department proposes to pursue experiments and research in this direction with a view to developing it as a large-scale cottage industry, independent of external supplies, thus providing employment to a great number of people. A number of young men are already understood to be undergoing training in the Department.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, December 28, 1938.

The wholesale paper market is currently reflecting the usual slackening of trade at the end of the year and an improvement in sales volume is generally looked for after the customary inventory period. The prevailing opinion appears to be more optimistic and that the upward trend in business will continue. The index of general business activity declined from 94.5 per cent to 93.6 per cent for the week ended December 17, compared with 84.5 per cent for the corresponding period last year. Production over two hundred paper mills was estimated at 81.2 per cent for the week ended December 17, compared with 60.0 per cent for the corresponding week last year. Production of paper board for the week ended December 17, was 65.0 per cent, compared with 51.0 per cent for the corresponding week in 1937.

The newsprint situation continues to slowly improve and this condition is generally viewed as satisfactory as can be expected in comparison with the state of general business.

Sales volume for the week in practically all grades of paper is reported by many manufacturers' representatives, jobbers, and general paper merchants as under that of the preceding two weeks, with some of the more popular grades of paper showing a larger volume than at the corresponding period last year. Prices, in general, are low and are relatively firm in sulphite bond papers. Some price cutting below representative quoted market prices is reported in some grades of kraft, and tissue paper, but this condition has continued, off and on, for many months and the practice of making price concessions to secure orders, is somewhat less prevalent now than it has been at various periods in the current year.

Mechanical Pulp

No important change in the market situation of mechanical pulp has been reported this week. Prices on all grades of domestic, Canadian, and European pulps are relatively firm, with contracts for the first quarter of 1939 placed at the prevailing price level.

Chemical Pulp

The demand for chemical pulp continues relatively light, as in the past few weeks. Although contracts for the better grades of imported and domestic sulphite pulps for the first quarter of next year conform to prevailing prices, with prime bleached sulphate quoted at from $45 to $55 per ton, some reductions in other grades are reported this week. Domestic kraft is currently quoted at from $25 to $35 per ton, f.o.b. pulp mill. Light and strong kraft is quoted at from $32 to $35 per ton, while No. 1 kraft is offered at from $29 to $33 per ton, and No. 2 kraft is quoted at from $28 to $29 per ton.

Old Rope and Bagging

The demand for old rope is very light and prices are virtually nominal. The demand for old bagging, excepting the roofing grades which are in good demand, is very light and prices conform to prevailing levels, which are practically nominal.

Rags

No important change in demand or prices on any grade of new and old domestic rags are reported for the current week. The foreign rag market is inactive and nominal prices prevail.

Old Waste Paper

Prices are practically nominal on most grades of waste paper and the market continues quiet with prices holding steady. Collections of the lower grades continue relatively large in comparison with the light demand, and little change in this market is looked for in the trade until demand improves. Prices are at a low level and the future trend is uncertain.

Twine

No important change in the twine market situation has been reported this week. Prices continue firm in all grades of hard and soft fiber twines. As prices on all grades of twine were revised upward two weeks ago, no change in the price situation is looked for in the trade in the near future.

Want Cape Vincent Harbor Developed

CAPE VINCENT, N. Y., December 27, 1938.—Carl B. Martin, vice president of the St. Regis Paper Company at a meeting here declared that the development of the port here would allow the movement of between 50,000 and 75,000 cords of pulpwood annually through here to be consumed by its mills in Northern New York. Herbert Weller, superintendent of the Cape Vincent Pulpwood Corp., testified that savings to Northern New York paper mills in shipping pulp wood through this port instead of by rail would be from $1.50 to $3 per cord. A government engineer told the gathering that there is a total demand in this vicinity for 130,000 cords of pulpwood and 264,000 tons of coal annually as well as sulphur for paper manufacturing and other miscellaneous supplies which could be largely handled through this port if it were properly improved. A letter was read from the Dexter Sulphite Pulp & Paper Company pointing to the necessity of getting its supplies more cheaply if it was to continue operations. Ernest C. Gould, secretary of the Watertown Chamber of Commerce, discussed the decline of the paper industry in this section and declared that the future of the paper industry hereabouts depends largely on the ability to get pulp and pulpwood in at a price that will enable Northern New York mills to compete with mills more favorably located to the source of supply.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, December 29, 1938.

ALUM (Activated)—Prices of activated alum continue firm and conform to prevailing market quotations. The commercial grades are quoted at $.90 per 100 pounds, in 100 pound multi-wall bags, car lot quantities, f.o.b., works.

BLANC FIXE—Quotations on blanc fixe remain firm and unchanged at prevailing market levels. The pulp is quoted at from $42.50 to $45 per ton, in bulk; the powder is quoted at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Prices of bleaching powder are unchanged and conform to prevailing market quotations. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported as improved for the week. Standard domestic ground casein, 20-30 mesh, is quoted at 9 cents per pounds; 80-100 mesh, at from 9½ to 10 cents per pound; all prices in bags, car lot quantities.

CAUSTIC SODA—Quotations on caustic soda are firm and conform to prevailing market prices. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Prices of china clay are firm and unchanged at prevailing market quotations. Domestic filler clay is quoted at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $14.50 to $25 per ton, ship side.

CHLORINE—Quotations on chlorine are firm and conform to prevailing market levels. Chlorine is quoted at $2.15 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The demand for rosin is reported as improved for the week. "G" gum rosin is quoted at $4.40; "F" wood rosin at $4.30 per 280 pounds gross weight, in barrels, at Savannah. Seventy per cent gum rosin size is quoted at $2.57 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake are firm and unchanged at prevailing market levels. Prices range at from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is quoted at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Prices of soda ash continue unchanged at prevailing market prices. Quotations on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—Quotations on corn starch remain firm and prices conform to prevailing market levels. Globe pearl is quoted at $2.60 per 100 pounds, in bags. Special paper starch is quoted at $2.70 per 100 pounds, in bags; all prices in car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Prices of sulphate of alumina continue firm and unchanged at prevailing market quotations. The commercial grades are quoted at $1.15; iron free at $1.30, per 100 pounds, in bags, car lot quantities, f.o.b., works.

SULPHUR—Quotations on sulphur continue at prevailing market levels. Annual contracts are quoted at $16 per long ton, f.o.b., cars at mines. Spot and nearby car lots are quoted at $19 per ton.

TALC—Prices of talc are unchanged at prevailing market quotations. Domestic talc is quoted at from $15 to $18 per ton, Eastern mines. Imported talc is quoted at from $25 to $40 per ton, on dock.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	@	—
Kraft—per cwt.—Delivered Zone A			
No. 1 Northern	$4.75	@	$5.25
Superstandard	4.12½	@	4.62½
Northern Standard Wrapping	4.00	@	—
Standard Wrapping	3.50	@	—
Tissues—Per Ream—Carlots			
White No. 1	.92½	@	—
White No. 1 M. G.	.90	@	—
White No. 1½	.67½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	.60	@	—
Unbl. Toilet, 1 M.	3.20	@	—
Bleached Toilet	5.26	@	—
Paper Towels—			
Unbleached	1.80	@	—
Bleached	2.10	@	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.25	@	9.75
No. 2 Jute	7.50	@	9.00
No. 1 Manila Wrapping, 35 lb.	5.00	@	—
No. 2 Manila Wrapping, 35 lb.	4.75	@	—
Boards, per ton—			
News	27.50	@	30.00
Chip	27.50	@	30.00
Sgl. Mla. Ll. Chip	42.50	@	—
Jute Lined Chip	42.50	@	45.00
White Pat. Coated	55.00	@	57.50
Kraft Liners	42.50	@	45.00
Binders Boards	71.00	@	77.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1.	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	31.05	@ 36.50	32.20	@ 37.75
85% Rag	.....		29.90	@ 35.00
75% Rag	23.60	@ 27.75	24.75	@ 29.00
65% Rag	.....		21.65	@ 26.25
50% Rag	17.55	@ 21.50	18.70	@ 22.75
25% Rag	14.65	@ 17.75	15.80	@ 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$8.60 @ $10.50	$9.75 @ $12.00
No. 2	7.70 @ 9.50	8.90 @ 10.75
No. 3	6.85 @ 8.25	8.00 @ 9.75
No. 4	6.45 @ 7.75	7.60 @ 9.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$10.80	@	$12.50
No. 2 Glossy Coated	9.25	@	10.75
No. 3 Glossy Coated	8.15	@	9.50
No. 4 Glossy Coated	7.65	@	9.00
No. 1 Antique (watermarked)	7.65	@	9.00
No. 2 Offset	7.00	@	8.25
A Grade E. F.	6.80	@	8.00
A Grade S. & S. C.	7.05	@	8.25
B Grade E. F.	6.25	@	7.50
B Grade S. & S. C.	6.50	@	7.75
C Grade E. F.	6.00	@	7.00
C Grade S. & S. C.	6.25	@	7.25
D Grade E. F.	5.70	@	6.75
D Grade S. & S. C.	5.95	@	7.00

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	25.00	@	28.00
Dry	25.00	@	28.00
(Delivered)			
No. 1 Domestic and Canadian	29.00	@	33.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.25	@	2.75
Prime Qualities—			
Easy-Bleaching Sulphite	1.90	@	2.10
Strong Unbleached Sulphite	1.80	@	2.00
(On Dock, Atlantic Ports)			
Kraft Bleached	2.25	@	2.75
Kraft Light & Strong	1.60	@	1.75
Kraft No. 1	1.45	@	1.65
Kraft No. 2	1.40	@	1.45
(F. o. b. Pulp Mill)			
Kraft Domestic	1.25	@	1.75
(Delivered)			
Soda Bleached	2.55	@	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	7.00	@	7.25
Silesias No. 1	4.00	@	4.25
New Unbleached	6.75	@	7.00
Blue Overall	5.00	@	5.25
Fancy	2.10	@	2.25
Washables	1.60	@	1.70
Mixed Khaki Cuttings	3.25	@	3.75
O. D. Khaki Cuttings	4.00		4.25

Old Rags

White, No. 1—			
Repacked	3.15	@	3.40
Miscellaneous	2.60	@	2.75
White, No. 2—			
Repacked	1.90	@	2.10
Miscellaneous	1.50	@	1.60
Thirds and Blues—			
Repacked	1.40	@	1.50
Miscellaneous	1.25	@	1.30
Roofing Rags—			
No. 1	1.15	@	1.20
No. 2	.90	@	1.00
No. 3 (bagging)	.85	@	.90
No. 4	.65	@	.70
No. 5A	.65	@	.70

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxford	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.50
No. 2 White Linens	6.50	@	7.50
No. 3 White Linens	4.50	@	—

APPLETON JORDANS

● Appleton Jordans are designed to safely withstand modern pressure jordaning. An extra margin of structural refinement is built in, guaranteeing correct operation under severe service conditions. The close-coupled motor is an exclusive feature. Year in and year out Appleton Jordans continue to give efficient performance with little attention.

THE APPLETON MACHINE COMPANY · Appleton · Wisconsin

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THE DRAPER FELTS

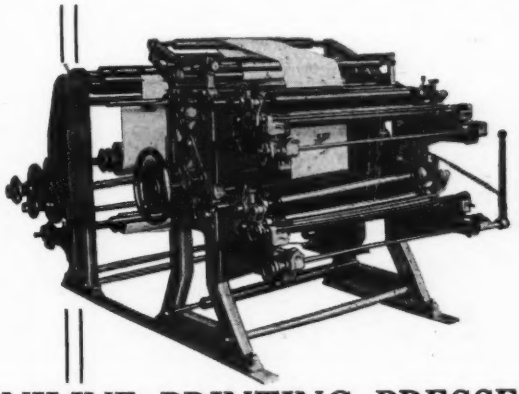
All kinds and styles of Felts for all kinds and styles of Papers.

Write us about your Felt problems and let us help you reduce your Felt Costs—we will call anywhere at any time.

DRAPER BROS. COMPANY

CANTON, MASS.

Woolen manufacturers since 1856



ANILINE PRINTING PRESSES

A specially designed unit for each and every purpose to which this new and popular process has been applied. One to four colors. Any widths. Units may be used with aniline inks, water soluble inks or soft oil inks. Specially designed sheeter for use with our presses with speed up to 400 lineal feet of sheeted stock per minute.

Hudson Sharp Machine Company

Green Bay, Wisconsin

No. 4 White Linens	2.25	@	3.25
No. 1 White Cotton	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	3.00
No. 4 White Cotton	1.90	@	2.20
Extra Light Prints	2.00	@	2.40
Ord. Light Prints	1.75	@	2.15
Med. Light Prints	1.55	@	1.95
Dutch Blue Cottons	2.25	@	2.50
French Blue Linens	3.00	@	—
Checks and Blues	2.00	@	—
Linsey Garments	1.90	@	2.00
Dark Cottons	1.50	@	1.60
Old Shopperies	1.30	@	1.45
New Shopperies	1.45	@	1.50
French Blues	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.40	@	2.50
Domestic	2.25	@	2.35
Wool Tares, light	1.80	@	1.90
Wool Tares, heavy	1.90	@	2.00
Bright Bagging	1.70	@	1.80
Manila Rope—			
Foreign	2.60	@	2.75
Domestic	2.50	@	2.75
Jute Threads	2.75	@	3.00
Sisal Strings	1.50	@	1.60
Mixed Strings	.60	@	.70

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.40	@	2.50
Ordinary Hard White No. 1	1.90	@	2.00
Soft White No. 1	1.75	@	1.80
Soft White Extra	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag	.70	@	.75
Solid Flat Book	.60	@	.65
Crumbled No. 1	.40	@	.45
Ledger Stock White	1.15	@	1.25
Ledger Stock Colored	.65	@	.70
New B. B. Chips	.15	@	.20
Manila—			
New Env. Cut	1.40	@	1.50
New Cuttings	1.25	@	1.35
Old Kraft Machine-Compressed bales	.65	@	.75
News—			
No. 1 White News	1.14	@	1.30
Strictly Overissue	.50	@	.55
Strictly Folded	.30	@	.35
No. 1 Mixed Paper	.15	@	.20

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.12¾	@	.14¼
White Hemp	.13¾	@	.15¼
Fine Polished—			
Fine India	.16	@	.18
Unpolished—			
Box	.09½	@	—
Paper Makers	.09½	@	.10½
Tube Rope	.10¼	@	.12½
Wall Paper	.10¼	@	.12½
Wrapping	—	@	—
Soft Fiber Rope	.12	@	.14
Cotton	.17	@	.20

(Hard Fiber)

Medium Java	.11	@	.17
Mex. Sisal	.10	@	.16
Manila	.18	@	.25

Domestic	2.65	@	2.75
Sisal Rope	1.60	@	1.65
Mixed Rope	.40	@	.50
Transmission Rope	1.90	@	2.00
Soft Jute Rope	1.80	@	2.00
Jute Carpet Threads	.75	@	.90
Gunny Bagging—			
Foreign	2.00	@	—
Domestic	1.75	@	1.85
Bleachery Burlap	3.25	@	3.50
Scrap Burlap—			
Foreign	1.60	@	—
Domestic	1.40	@	1.55
Scrap Sisal	1.25	@	1.50
Scrap Sisal for Shredding	1.65	@	1.85
Wool Tares, Heavy	1.60	@	1.65
New Burlap Cuttings	2.00	@	2.25
Aust. Wool Pouches	2.75	@	3.00
Heavy baling bagging	1.75	@	1.85
Paper Mill Bagging	1.00	@	1.15
No. 2 Bagging	.55	@	.75

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.03¾	@	.03½
New White No. 1	.06¾	@	.07
New Light Flannelettes	.04¼	@	.04¾
Silesias No. 1	.04½	@	.04¾
New Black Silesias	.03¾	@	.04
Soft Unbleached	6.50	@	7.00
Blue Cheviots	.05	@	.05¾
Fancy	.03	@	.03¾
Washable	.02¾	@	.03

Cottons—According to grades—			
Blue Overalls	.04¾	@	.05
New Black, soft	.03¾	@	.04
Khaki Cuttings	.03	@	.03½
O. D. Khaki	.04	@	.04½
Corduroy	.02¾	@	.03
New Canvas	.06¾	@	.07¼
B.V.D. Cuttings	—	@	.06½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.00
Old Blue Overalls	1.50	@	—
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	1.00	@	1.10
No. 2	.75	@	.85
No. 3	.65	@	.70

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.05	@	1.15
Dutch Blues	2.65	@	2.75
New Checks and Blues	2.85	@	3.00
Old Fustians	2.25	@	2.50
Old Linsey Garments	2.20	@	2.25
New Silesias	4.75	@	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.06	@	.06¼
New White, No. 2	.03½	@	.04
Light Silesias	.03½	@	.04
Silesias, No. 1	—	@	.04½
Black Silesias, soft	—	@	.03
New Unbleached	.05½	@	.06
Washable, No. 1	.01½	@	.01¾
Blue Overall	.04	@	.04½
Cottons—Acording to grades—			
Washable No. 2	.01	@	.01¼
New Blue	.01	@	.01¾
Fancy Percales	—	@	.02½
New Black Soft	.03	@	.03½
New Light Seconds	—	@	.04½
New Dark Seconds	.50	@	.75
Khaki Cuttings—			
No. 1 O. D.	.03	@	.03½
No. 2 Mixed	.02	@	.02½
Corduroy	—	@	.02
New Canvas	.05	@	.05½
New Black Mixed	.02½	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.25
Miscellaneous	2.50	@	2.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1	—	@	.95
Domestic No. 1	—	@	.95
Domestic No. 2	—	@	.85
Roofing Bagging	—	@	.60

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.75	@	2.00
Domestic	1.50	@	1.75
Manila Rope	—	@	3.50
Sisal Rope	1.50	@	1.75
Mixed Rope	.75	@	1.00
Scrap—			
No. 1	—	@	1.75
No. 2	1.00	@	1.25
Wool Tares, heavy	3.25	@	3.50
Mixed Strings	.75	@	1.00
No. 1 New Light Burlap	2.50	@	3.00
New Burlap Cuttings	1.75	@	2.00

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White	1.75	@	1.80
No. 2 Soft White	1.30	@	1.40
No. 1 Mixed	.65	@	.75
Solid Ledger Stock	1.45	@	1.50
Ledger Stock, white	1.15	@	1.20
Ledger Stock, colored	.75	@	.80
No. 1 Books, heavy	.60	@	.75
Manila Cuttings	1.45	@	1.50
Print Manila	.40	@	.45
Container Manila	.35	@	.40
Kraft Paper	.75	@	.80
No. 1 Mixed Paper	.20	@	.25
Straw Board Chip	.25	@	.30
Binders Board Chip	.25	@	.30
Corrugated Board	.50	@	.55
Overissue News	.40	@	.45
Old Newspapers	.35	@	.40

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White	1.85	@	2.15
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.65	@	.75
No. 1 Books, light	.65	@	.75
Crumpled Stitchless Book Stock	.55	@	.65
Manila Env. Cuttings	1.85	@	2.00
Manila Envelope Cuttings, extra quality	2.00	@	2.10
No. 1 Old Manila	.80	@	.90
White Blank News	1.30	@	1.40
No. 1 Kraft	.90	@	—
Mixed Papers	.15	@	—
Print Manila	.45	@	.55
Container Manilas	.27½	@	—
Old Newspapers	.25	@	.32½
Paper Wool Strings	.50	@	.65
Overissue News	.45	@	.50
Box Board Chips	.20	@	.25
Corrugated Boxes	.30	@	.35
Kraft corrugated boxes	.65	@	.70
Screening Wrappers	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.65	@	2.75

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings	1.80	@	1.90
No. 1 Hard White	1.70	@	1.80
No. 1 Soft White	1.50	@	—
Ledger & Writings	.75	@	.80
Solid Books	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts	1.10	@	—
Manila Env. Cuts	Nominal		
Ex. No. 1 Manila	Nominal		
Print Manila	Nominal		
Overissue News	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.20
Roofing Stocks—			
No. 1	1.00	@	1.05
No. 2	.85	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots

No. 1 White	$35.50	@	—
No. 1 Tints	36.50	@	—
No. 2 White	25.50	@	—
No. 2 Tints	26.50	@	—
No. 2 Golden Rod	27.50	@	—
No. 3 White	21.00	@	—
No. 4 White	15.00	@	—
No. 4 Tints	16.00	@	—
No. 4 Golden Rod	17.00	@	—
Direct mill shipment in three-ton lots			
No. 5 White	$10.50	@	—
No. 5 Tints	11.50	@	—
No. 5 Golden Rod	12.00	@	—
No. 6 White	9.00	@	—
No. 6 Tints	9.50	@	—
No. 6 Golden Rod	11.00	@	—
No. 7 White	8.00	@	—
No. 7 Tints	8.50	@	—
No. 7 Golden Rod	10.00	@	—
Book—			
No. 1 M. F.	$7.00	@	—
No. 2 M. F.	6.50	@	—
No. 3 M. F.	5.25	@	—
No. 1 S. C.	7.25	@	—
No. 2 S. C.	6.75	@	—
No. 3 S. C.	5.75	@	—

Coated Book & Litho

Ton Lots (resale)

No. 1	$12.00	@	—
No. 2	10.25	@	—
No. 3	8.90	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.85	@	5.25
White Wrap	4.00	@	—
"B" Manila	4.90	@	6.15
No. 1 Manila	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)	46.00	@	—
Sheets	54.00	@	—

Pulp

Ground wood	29.00	@	—
Unbleached Sulphite	49.00	@	—
Kraft	50.00	@	—
Soda	54.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.25	@	—
Soft White	2.15	@	—
White Blk. News	1.25	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	.80	@	—
Light and Crumpled Book Stock	.70	@	—
Ledgers and Writings	1.10	@	—
Manilas—			
New Manila Cut	1.35	@	—
Printed Manilas	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue	.50	@	—
Strictly Folded	.45	@	—
No. 1 Mixed Paper	.30	@	—

Domestic Rags

(Price to Mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06½	@	.06¾
Fancy Shirt Cuttings	.02¼	@	.02½

Index, Technical Section, Paper Trade Journal, Volume 107, July to December, 1938

Prepared by Clarence J. West, Chairman, Committee on Abstracts and Bibliography, TAPPI

The page numbers in the following index refer to the continuous paging of the *Technical Section* and have no relation to the pagination of the individual numbers of the PAPER TRADE JOURNAL.

References to abstracts of periodical articles published in the *Technical Section* are preceded by the letter "A"; those to patents are indicated by the letter "P". Other entries refer to original articles published in this *Section;* the author entries for such articles are printed in capitals. No author entries are given for the abstracts or patents.

In order to facilitate reference to the individual numbers of the PAPER TRADE JOURNAL, the following table is given, showing the pages of the *Technical Section* appearing in each of the 26 numbers of Volume 107 of the PAPER TRADE JOURNAL, (July to December, 1938):

No. 1	July	7	1- 10	No. 14	Oct.	6	159-168
No. 2	July	14	11- 22	No. 15	Oct.	13	169-182
No. 3	July	21	23- 24	No. 16	Oct.	20	183-192
No. 4	July	28	25- 38	No. 17	Oct.	27	193-206
No. 5	Aug.	4	39- 50	No. 18	Nov.	3	207-216
No. 6	Aug.	11	51- 62	No. 19	Nov.	10	217-228
No. 7	Aug.	18	63- 74	No. 20	Nov.	17	229-238
No. 8	Aug.	25	75- 84	No. 21	Nov.	24	239-248
No. 9	Sept.	1	85- 96	No. 22	Dec.	1	249-252
No. 10	Sept.	8	97-108	No. 23	Dec.	8	253-264
No. 11	Sept.	15	109-138	No. 24	Dec.	15	265-274
No. 12	Sept.	22	139-148	No. 25	Dec.	22	275-288
No. 13	Sept.	29	149-158	No. 26	Dec	29	289-298

A

Abies nephrolepsis Max., chemical composition A64
Abietic acid
  Heat aging of paper, effect on 81
  Preparation 77
Abietyl compounds, use in moth-proofing P1
Abitibi Paper and Power Co., Ltd. A40
Absorption coefficients 80
Acetic acid
  Mechanical pulp, formation from, with alkali 186
  Pulping, use in P161
Acetosyringone, preparation from lignosulphonic acid A85
Acetovanillone, preparation from lignosulphonic acid A85
Acetyl group, determination in wood A51
Acidity, determination in paper ... A193
Acids, fatty, use in pulping P161
Acoustical board, cornstalk A1
Acrylic resins, adhesives, use as .. A288
Adhesives
  Acrylic resins A288
  Fiber board P24
  Graphic arts, use in A288
  Insolubilizing in humid atmospheres P24
  Vinyl resins A288
ADKINS, HOMER, *See* Harris, E. E.
Air
  Calcium hypochlorite, effect on 106
  Drier, accumulation in A170
  Pulping, use in P161
Air conditioning A264
Air resistance, specific A230
Akaezo matsu, pulping..... A64
Akamatsu, chemical composition .. A64
Alcohols
  Alkaline process, use in P97
  Pulping with P296
Aldehydes
  Lignin determination, effect on A85
  Lignocellulose plastics..... P24
Alkali, concentration, effect on delignification of wood A85
Alkaline process 85, 97, 139, 149, 286
  Alcohols, use in..... P97
  Alkali concentration, effect of.. A286
  Aniline in..... P97
  Annual plants in..... P86
  Goldenrod in..... A286
  Mitsumata in..... A286
  Pyridine in..... P97
  Review 253
  Solidago serotina in..... A286
  Straw in..... P97
  Superheated steam in..... P97
  Temperature, effect of..... A286
  Triethanolamine in..... P97
Alkyd resin and tall oil in paints.. A149
Alpha-cellulose, volumetric determination A216
Alpha-pulp, adsorption of sodium hydroxide 185
Alum
  Delivery to paper market..... P252
  Drainage, effect on..... 48
  Filler retention, effect on..... A170
  Function of..... A52
Aluminum chloride, effect on calcium hypochlorite..... 106
Aluminum foil, use in thermal insulation P1
Aluminum hydroxide, adsorption by cellulose A298
Aluminum resinate
  Heat, effect of..... A298
  Sizing with..... A297
Aluminum sulphate
  Cellulose, adsorption by..... A298
  Pulp, adsorption by..... A297
American Writing Paper Co..... A40
Amino acids, effect on lignin determination A85
Ammonium hydroxide, solubility of chlorinated lignin in..... 98
Aniline, use in alkaline process.... P97
Annual plants, alkaline pulping... P86
Antioxidant, use in rosin size..... P169
ARNOLD, GEORGE C., SIMMONDS, F. A., and CURRAN, C. E. Solution of chlorinated lignins in dilute alkalies..... 98
Art paper, defects..... A230
Asbestos A40
Asbestos felts..... A264
Ash, effect on alkali sorption of pulp 187
Aspen
  Growth improvements in.... A51, A63
  Tetraploid A63
Asphalt
  Emulsifying agents..... A239
  Roofing, coating of, with..... P1
Asphalt paper, fireproof..... P229
Automatic extraction pressure machine 111

B

Bag paper, naphthenic acids in cuprammonium hydroxide for impregnating A239
Bag waste..... 218
Bagasse
  Nitric acid pulping..... A161
  Pentosans, isolation with sulphuric acid..... P193
  Pulping A65
Bagasse pulp, nitric acid, properties A161
Bags
  Pasted A230
  Waterproof P230
BAIRD, P. K. *See* Seborg, C. O.
Bakelite, paper impregnated with.. A230
BAKER, C. M. *See* TAPPI Waste Committee.
Balsam
  Density A64
  Growth rate..... A64
Bamboo, Pomilio process..... A97
Barium hydroxide, effect on pitch troubles in mechanical process... A161
Bark, willow, pulping..... A64
Basis weight, influence on pulp swelling A183
Batching scales..... 28
Bathurst Power and Paper Co., power plant..... A52
Bearings, anti-friction..... A38
Beater roll, bars and separating elements in..... P297
Beater room
  Control 102
  Report form..... 3
Beating
  Abstracts 170, 296
  Critical temperature, determination A170
  Degree of, factors affecting.... A296
  Electrostatic effects in..... P297
  Filler retention, effect on..... A170
  Freeness, effect on..... 192
  High speed frictional effects in P297
  Hygroscopicity of pulp, effect on 223
  Magnetic effects in..... P297
  Pulp swelling, effect on..... A183
  Review 255
  Temperature curve..... A170
  Thermal relations in..... A170
  Water retention of pulp, effect on 94
Bed plate, magnetic material for... P297
Beech wood, pentosans from with sulphuric acid..... P193
Beloit horizontal dual press..... 20
Benson boiler..... A39
Benzidine, tetradiazotized, as stain for heartwood and sapwood..... A51
Benzyl alcohol, isolation of lignin with 294
Beta-cellulose, volumetric determination A216
Betura mandshurica Nakai, chemical composition A64
Bewoid size..... A298
Biffar process..... A230
Birch, growth improvements..... A51
Bitumens, emulsifying agents..... A239
BIXLER, A. L. M. Effects of digestion on wood structure..... 171
Black liquor
  Chlorinated lignin from..... 99
  Combustion A149
  Evaporation P86
    de Verdier system..... A97
    Thermal code for..... 69
  Fuel, use as..... A86
  Lignin from..... 99
  Pulping with..... P86
  Recovery P86
    Thermal code..... 69
  Soda
    Analysis A139
    Conductometric titration.. A139
  Spraying for evaporation..... P86
  Straw, lignin, determination of A139
  Tomlinson process A86, A149
  Wood delignification, effect on A86
Bleach residues, heat aging of paper, effect on..... 82
Bleach solutions, coolers for..... 289
Bleach washer wastes, fiber concentration 261
Bleaching
  Abstracts 161, 297
  Chlorine-lime P297
  Chlorites in..... P297
  Chlorous acid in..... P297
  Hygroscopicity of pulp, effect on 223
  Kraft pulp.....A161, P297
  Mill control methods..... A183
  Multistage A161, P297
    Chlorine consumption.... 165
    Hydrogen ion concentration, effect of..... 165
    Sulphate pulp..... A161

Sulphite pulp..... 165
Paper, heat aging, effect on.. 81
Pulp swelling, influence on... A183
Reaction times..... 62
Review A161, 254
Review, 1937..... A170
Sulphate pulp..... A161
Multistage A161
Sulphite cooking liquors, effect of A194
Swedish plant..... A297
Western hemlock pulp, growth rate, effect of..... 153
Wood structure after digestion, effect on..... 179
Bleaching plant..... A297
Flow diagram..... 60
Time-cycle diagram..... 60
Bleaching powder, preparation.... A139
Blotting paper, printing..... A217
Blowdown heat recovery..... 194
Blue stain
Lignasan, effect of, on..... A296
Pulpwood, effect on..... A63
Southern pine, effect on..... A63
Board
Absorbent A24
Building A230
Coating equipment A37
Conditioning A216
Cornstalk A1
Drier P183
Dusting, tester for..... A37
Electric insulating..... A37
Fireproofing A239
Insulating
Cornstalks A37
Forming machine..... A37
Jacquard A37
Moisture content,
Humidity, effect of..... A193
Indicator for..... P38
Temperaturde, effect of.. A193
Sanitary standards..... A229
Sound absorption..... A1
Tests for..... A216
Warping A263
Waterproofing P230
Wrinkles, cause of..... A37
Board machine
Sheet width regulator..... A38
Vat, cut squirt for..... A38
Board mill, waste paper condition in 218
Boiler feed pump pressure, effect on steam pressure..... 112
Boiler plant, cost of high pressure steam 113
Boilers
Forced circulation..... A39
Selective factors..... 128
Boxboard, fuzz detector..... 251
Branches
Factors determining..... A286
Pinewood, effect on..... A286
BRAY, MARK W. *See* Schwartz, S. L.
Breast box..... P263
Pulp flow from..... P39
Skimmer for..... P39
Brightness, measurement of..... 283
Broke
Measurement of..... 103
Report form..... 4
Brown Paper Mill Co..... A40
Buelle flyash eliminator..... A264
Burner gas cooler, spray type..... 293
Burner gases
Cooling A287
Heat recovery..... A287
Sulphur compounds, determination of..... A159
Bursting strength, effect of springwood content..... 34
Bursting value..... A216
Byproduct power..... 110

C

Calcium bicarbonate, removal from water 118
Calcium carbonate
Resin-coated, coating with.... P298
Sizing, use in..... P298
Sizing paper filled with..... P298
Water-resistant coating for.... P298
Calcium chloride, bleaching powder, content of..... A139
Calcium chlorite, bleaching powder, content of..... A139
Calcium hydroxide
Calcium hypochlorite, effect on 106
Chlorinated lignin, solubility of 98
Chlorination of..... A139
Pulping with..... P86
Calcium hypochlorite, stability of. 106
Calcium oxide, slaking..... A139
Calcium sulphate, addition to white water A252
Calcium sulphite, presence in pulp A159
Calender, embossing..... A264
Calendering, effect on oil-resistance A230
Cambial walls, structure..... 180
Carbohydrates, effect of hydrochloric acid..... A75
Carbon paper..... P229
Carbon tetrachloride, cleaning of wires with..... A38
Carbonaceous zeolites..... 92
Water treatment with..... 114
Cardboard
Coating with cellulose esters.. P263
Drying in sheets..... A217
Kieselguhr in..... P217
Sodium silicate in..... A217
Stearates in..... P217
Straw P217
Warping of..... A263
Waterproofing P217
CARPENTER, CHARLES, *See* Fuller, A. C.
CARSON, F. T. Notes on attaching a membrane to a water vapor-permeability cell..... 213
Carton, crushing strength..... A216
Casein
Board, coating of..... A37
Colloid chemistry..... A288
Castenea Paper Co..... A40
Causticizing
Continuous A139
Control of..... A139
Factors in..... A139
Cedar, pulping with sodium sulphite A149
Cellophane
Adhesives for..... A288
Moistureproof P1
Cellulose
Abstracts 65, 75, 85
Acid degradation..... A75
Adsorption by..... A298
Alpha A65
Aluminum, adsorption of..... A298
Amphoteric nature..... A298
Chemical properties..... A63
Chemistry, review..... 242
Colloid chemistry..... A288
Constitution A75
Degree of gelatinization..... 94
Flax A65
Mercerized
Refractive index..... A65
Water absorption..... A65
Nitric acid, action of..... 23
Oxidation 23
Oxidation products..... A75
Photochemical oxidation..... A65
Refractive index..... A75
Solubility in cuprammonium hydroxide 190
Solvents 190
Ultraviolet light, oxidation by A65
Volumetric determination..... A216
Water absorption..... A65
X-ray structure..... A65
Cellulose acetate, coating artificial leather
Cellulose esters
Coating with..... P263
Review 244
Waterproofing A239
Cellulose ethers
Coating with..... A170
Review 244
Sizing with P169
Waterproofing A239
Cellulose films
Artificial aging..... A216
Cellulose hydrate..... A65
Refractive index..... A65
Chart paper A239
CHIDESTER, G. H., and McGOVERN, J. N. Effect of age and growth rate on sulphite pulps from western hemlock..... 150
CHIDESTER, G. H., McGOVERN, J. N., and McNAUGHTON G. C. Comparison of sulphite pulps from fast growth loblolly, shortleaf, longleaf and slash pines..... 32
See also McGovern, G. N.
China clay, coating of board with. A37
Chip length, role in sulphite process 72
Chip sorter..... P264
Chips, packing in digesters..... A159
Chlorine, slime control with..... A40
Chlorine process.....A97, P139
Pine wood..... A97
Chloroacetic acid
Lignin, action on..... A85
Wood pulp, effect on..... A85
Cigarette paper, artificial resins in P1
Cladosporium herbarum, effect of lignosan on..... A296
Clay
Colloidal chemistry..... A288
Degree of beating, effect on.. A296
Filler, value as..... A170
Retention, factors in..... A170
Structure A170
Coated paper, odor trouble from paraffin A239
Coating
Boards A37
Cellulose acetate..... P1
Cellulose esters..... P263
Cellulose ethers..... A170
Clyceryl ester of sebacic acid. A170
Latex-catechol P217
Latex-gallic acid P217
Latex-pyrogallic acid..... P217
Latex-tannin P217
Latex-tanning agents..... P217
Micrcscopic study..... 59
Modifying agents in..... A170
Moistureproof P1
Nitrocellulose A230
Paraffin, two-stage..... P24
Protein-formaldehyde P217
Surface, of boards..... A37
Coating equipment, boards..... A37
Coating materials..... 169
Cochineal reaction for oxycellulose A75
Colloid chemistry..... A288
Color, specification of..... 282
Colorimeter, photoelectric, three-filter 285
Condenser paper
Russian manufacture..... A239
Sulphate pulp for..... A230
Condensing power..... 110
Conduits, saturating in a vacuum.. P24
CONNOR, C. M. Effect of alkalinity and impurities on the stability of calcium hypochlorites..... 106
See also Specht, H. G.
Consistency
Degree of beating, effect on.. A296
Freeness, effect on..... 192
Consistency regulator, regulating device P252
Consolidated Water Power and Paper Co..... A40
Construction materials, wood..... A64
Container boards, sanitary standards A229
Container Corporation of America, power house..... A39
Containers
Acid-free liners..... A263
Irregular contour, molding.... P24
Latex-tannin coating..... P217
Paraffin coating..... P24
Strawboard A263
Tests for..... A216
Contrast ratio, definition..... 198
Contrast visibility, definition..... 198
Conversion cost..... 66
Conveyors, pneumatic..... A263
Coolers, heat transfer in..... 289
Copper number, relation of tensile strength A75
Copper sulphate
Sizing, effect on..... A297
Slime control with..... A40
Core oil, use of sulphite waste liquor as.....A160, P160
Cornstalk acoustical board..... A1
Cornstalk board..... A37
Cornstalk, conversion for tub sizing A169
Corrugated containers, tests..... A216
Cost accounting..... 2
Costs
Machine conversion..... 66
Variance analysis..... 8
Cotton
Cellulose, refractive index.... A75
Hydrocellulose, test for..... A75
Oxycellulose, test for..... A75
Cotton-asbestos felts..... A264
Cotton linter cellulose, refractive index A75
Cowan processing system..... A170
Cowles classifiner..... A252
Cowles refiner..... P38
Crocker Burbank and Co..... A40
Crown-Zellerbach Corporation.... A40
Crush tester, Hinde and Dauch Paper Co..... A216
Cuprammonium hydroxide, naphthenic acid in, waterproofing with A239
Cupric hydroxide, adsorption by pulp A297
CURRAN, C. E. *See* Arnold, G. C.
Cutter P264
High-speed P264
Cylinder machine
Absorbent board on..... A24
Propeller wheel P38

D

Decalso, water treatment..... 115
Degree of gelatinization..... 94
Delignification, mechanism of..... A159
Delignification rate, Douglas fir, effect of initial concentration.... 140
Diffusers, pulp washing in..... A39
Digester
Chip packing in..... A159
Circulation in..... 41
Schauffelberger system.... 44
Experimentai of stainless steel A85
Forced circulation..... 41
NAF circulation..... 41
Pressure controller, time cam. A149
Sulphite, circulation in..... A149
Digester blowdown, condensing system 194
Digester relief gases
Coolers for..... 289
Heat recovery..... 194
Turpentine recovery..... 194

Dirt
Removal, Vortrap for..... P252
Sulphite pulp, causes of..... A194
Disc refiner..... A252
DIXSON, HENRY PHILIP Jr. *See* Morgan, Howard
Dorr continuous causticizing system A139
Douglas fir
Delignification in sulphate pulping
Chemical ratio, effect of.. 140
Hydrolysis in sulphate pulping
Chemical ratio, effect of.. 140
Initial concentration, effect of 140
Initial concentration, effect of 140
Sulphate process
Delignification, variables.. 140
Hydrolysis, variables..... 140
DOWNS, MARTIN L. An analytical study of various pulps with reference to alkali binding..... 184
Drainage
Alum, effect of..... 48
Hydrogen ion concentration, effect of..... 48
Sulphuric acid, effect of..... 48
Temperature, effect of..... 48
Waterhardness, effect of..... 48
Wire mark, effect of..... 48
Drawing paper..... A239
Drier
Air A170
Air accumulation in..... A170
Air pressure for condensate removal P298
Condensate removal P183
Air pressure for..... P298
Condensate system..... A170
Cowan processing system..... A170
Cylinder, drainage in..... A170
Crewin system..... A170
Moisture control system..... A170
Open A170
Steam, low temperature, condensate removal..... P298
Steam line, valve for..... P298
Vacuum A170
Vapor removal..... A170
Drive, electric, sectional..... A39
Drum reel, constant tension, regulator for..... A183
Drying
Abstracts .....170, 183, 20[illegible]
Cardboards in sheets..... A217
Furnace gases for..... A217
Hygroscopicity, effect on..... 226
Hygroscopicity of pulp, effect on 225
Review A161
Sized paper, effect on..... A298
DuBOIS, H. A., and SMITH, B. F. Data on heat exchanger performance 289
Dusting
Board, test for..... A37
Tester for..... A37
Dyes
Applications A230
Colloid chemistry of.....A169, A288
Delivery to paper machine.... P252
Hydrogen ion concentration and A169
Malachite Green..... A169
Ultramarine A169

E

Egg-trays, molding..... P24
Eimer and Amend improved reflection meter..... 231
Elasticity of paper..... A216
Electrical insulation paper..... A230
Electricity, dangers from..... A264
Electroplating, use of sulphite waste liquor P287
Embossing calender..... A264
Esparto, Pomilo process for..... A97
Esthonia, paper industry of..... A288
Ethylcellulose, sizing with..... P169
Ethylmercuric chloride (Lagnasan)
Blue stain, effect on..... A296
Fungus in pulp, effect on..... A296

F

Fahrni hydraulic press..... A230
Feed water
Conditioning 89
High-pressure boilers, treatment in 89
Hydrogen zeolite process..... 92
Phosphate treatment..... 91
Silica, removal of..... 90
Sulphurous acid treatment..... 93
Zeo-Karb H treatment..... 115
Zeolite softening..... 91
Felt guide, regulating device..... P252
Feltex, felt washing with..... A170
Felts
Asbestos A264
Asbestos-cotton P38
Drier, asbestos-filled..... P38
Life, temperature, effect of.... A264
Washing agents..... A170
Wet, increased life..... A264
Wool-asbestos A264
Ferric chloride, effect on calcium hypochlorite 106
Fiber analysis..... 54
Fiber membranes..... 190
Fiberboard
Adhesive for..... P24
Fireproofing..... A239
Manufacture A230
Tests A216
Fibroplast A230
Fillers 169
Alkaline P229
Calcium carbonate..... P229
Clay, value of..... A170
Costs, calculation of..... 7
Degree of beating, effect on... A296
Paper properties, effect on.... A170
Particle size..... A169
Retention and particle size.... A169
Retention, factors in..... A169
Sheet, addition to, on wire.... P298
Structure A170
Titanium oxide P229
Titanium pigments..... A239
Filters, application..... A230
Fine papers, sulphite pulp for..... A160
Finishing costs, calculation..... 8
Finland, paper industry in..... A288
Fir, lignin content..... 295
Fireproof asphalt paper..... P229
Fireproofing A239
Boards A239
Flow box..... P263
Branched pipe for pulp..... P39
Pulp flow from..... P38, P39
Flyash, prevention..... A264
Foam A288
Pine pulp..... A296
Prevention P24
Foam killers A288, A296
Folding boxboards, sulphite pulp for A160
Folding strength, effect of springwood content..... 34
Food containers, bacterial control.. A40
Food packages, paper for..... A229
Formaldehyde-urea resin, waterproofing with..... P217
Formation apparatus P252
FOSTER, PELL W., Jr. Digester blowdown condensing system.... 194
France, paper industry of..... A288
Freeness
Beating, effect of..... 192
Consistency, effect of..... 192
Recording tester..... 191
FRIEDMAN, LEO, and McCully, C. ROLAND. Isolation of lignin with benzyl alcohol..... 294
Fructose, effect of hydrochloric acid on A75
Fuel, black liquor as..... A86
FULLER, A. C., and CARPENTER, CHARLES. Newsprint from pine mechanical and chemical pulps. Grinding experiments with a course grit synthetic stone..... 86
Furfural-lignocellulose plastic..... P24
Furnish
Control in beater room..... 104
Cost, data for..... 5
Fuzz detector..... 251

G

Gamma-cellulose, volumetric determination A216
Gases, coolers for..... 289
Gaylor Container Corporation, recausticizing and lime recovery.. 35
Gilsonite-vaseline, use in electric insulation paper..... A229
Glassine paper
Kraft pulp for..... P193
Transparency 198
Gloss
Measurement of..... 284
Reflectivity, relation of..... A194
Gluconic acid, preparation from pine wood A286
Glue
Aluminum adsorption of cellulose, effect on..... A298
Board, coating with..... A37
Sizing, microscopic study..... 57
Goldenrod, papermaking material.. A286
Grade costing, forms for..... 4, 6
Graph paper..... A239
Grasses, Pomilio process for..... A97
Great Northern Paper Co..... A40
Grewin system, steam saving with A170
Grindstones. *See* Pulpstones
Groundwood. *See* Mechanical pulp
Growth rate, western hemlock, effect on pulping..... 150

H

HAGENAUER, JOHN P. Operations—cost—sales 66
Hammermill Paper Co..... A40
Hard paper A230
Hardwoods
Japanese A64
Manchurian A64
HARRIS, ELWIN E., and ADKINS, HOMER. Reactions of lignin with hydrogen..... 236
Head box
Baffles P39
Design and operation..... A252
Heartwood
Color reactions..... A51
Growth rate, effect of..... 32
Sapwood, differentiation of.... A51
Heat, recovery from relief gases... 194
Heat exchangers..... 289
Performance, calculation of.... 289
Heliographic paper..... A239
Hemicelluloses A63
Extraction A65
Preparation A65
Hemlock, lignin content..... 295
High pressure steam
Boiler plant, cost of..... 113
Economics 109
Equipment cost..... 112
Fuel costs 113
Hinde and Dauch Paper Co. crush tester A216
Hindsdale Paper Mfg. Co., power plant A39
History
Research, need of..... A288
Southern U. S..... A52
HOFFMAN, W. F. Beater room control 102
HOLMAN, G. E. New fuzz detector 250
Holocellulose, review..... 243
Horizontal dual press..... 20
Humidity
Board, moisture content, effect on A193
Paper, heat aging, effect on.... 82, 83
Hunter multipurpose reflectometer. 275
Hydration, review..... 255
Hydrator P297
Hydrocellulose
Definition A75
Identification A75
Hydrogen ion concentration
Aluminum adsorption by cellulose, effect on..... A298
Degree of beating, effect on... A296
Determination of..... A288
Drainage, effect on..... 48
Dyeing, role in..... A169
Dyes, relation to..... A169
Filler retention, effect on..... A170
Multistage bleaching, effect on 165
Paper, determination in..... A193
Sizing, effect on..... A297
Slide comparator for..... 215
Hydrogen zeolite..... 92, 115
3-(4-Hydroxycyclohexyl)propan-1-ol from lignin..... 236
Hydroxyethylcellulose, sizing with P169
Hygroscope 28
Hygroscopicity, apparatus for determination 225

I

Illumination A264
Infilco causticizing system..... A139
INSTITUTE OF PAPER CHEMISTRY. Instrumentation Studies. XXVII. Rate of penetration of oil through paper. II. An improvement in the method of calculating rates and distances penetrated from data obtained with the I. P. C. photoelectric penetration meter 210
INSTITUTE OF PAPER CHEMISTRY. Instrumentation Studies. XXVIII. Study of photoelectric instruments for the measurement of color: Reflectance and transmittance. IV. The Eimer and Amend improved reflection meter 231
INSTITUTE OF PAPER CHEMISTRY. Instrumentation Studies. XXIX. A study of photoelectric instruments for the measurement of color: Reflectance and transmittance. V. The Hunter multipurpose reflectometer..... 275
Insulating board A37
Air infiltration, reduction of.... A37
Drying tests A37
Forming board A37
Sizing with wax..... A37
Surface coating..... A37
International Cellucotton Products Co. A40
International Paper and Power Co. A40
Inulin, effect of hydrochloric acid on A75
Ipil, chemical composition..... A64
Ives tint photometer..... A216

J

JACKSON, DONALD T. *See* Parsons, J. L.
Jacquard board A37
JAHN, EDWIN C. Degree of gelatinization of cellulose and wood 94

Jet condenser system, blowdown heat recovery 194
Jordan shell lining P297

K

Kaolin, structure A170
Ketones, lignocellulose plastics, use in P24
Kimberly Clark Corporation A40
Knotter P252, P264
KOCH, R. J. Morse chain drive on New York State College of Forestry paper machine 249
KOLFLAT, ALF. Economics of high pressure steam for paper mill power plants 109
Kraft cooking liquor, effect on wood structure 171
Kraft pulp
  Alkali purification P193
  Bleaching A161
    Pomilio process A97
  Blue-stained southern pine for A63
  Chlorinated lignin, extraction of 99
  Lignin, isolation of 99
  Sodium hydroxide, adsorption of 185
  Washing A39
Kubelka and Munk equation 79
KUHNER, M. H. Steam generation for paper mills 127

L

La Mont boiler A39
Larch, pulping A64
Larix sibirica, pulping with sodium sulphite A149
Latex
  —Catechol, coating with P217
  Coating with P217
  —Gallic acid, coating with P217
  —Pyrogallic acid, coating with P217
  —Tannin, coating with P217
Latvia, paper industry in A288
Leather, artificial, cellulose acetate coating P1
Lecithin, foam prevention with P24
LEE, H. N. Biological methods in paper diagnosis 53
LEWIS, H. F. Existence and nature of fiber membranes 190
LEWIS, HARRY F. Survey of American literature in the field of cellulose and related subjects for 1933 through 1937 ..... 240, 253, 265
Light
  Lignin, effect on A287
  Mechanical pulp, effect on A287
Lignasan. *See* Ethylmercuric chloride
Lignin A63
  Abstracts 65, 75, 85, 286
  Adsorption isotherms 224
  Alcohol for removal P296
  Alkali degradation products A85
  Alkali adsorption of pulps, effect on 187
  Benzyl alcohol, isolation with 294
Decomposition products A286
Chlorinated, solubility in alkali 98
Chloroacetic acid, action of A85
Chloroacetic ester A85
Determination
  Acid pretreatment, effect of A85
  Aldehydes, effect of A85
  Amine number method A194
  Goss and Phillips method A75
  Hydrochloric acid method A75
  Johnsen-Noll method A194
  Methods of A194
  Nippe method A194
  Phenols, effect of A85
  Pulp A193
  Proteins, effect of A85
  Sieber method A194
  Straw black liquor A139
Hydrochloric acid, hydrolysis by A75
Hydrogen, reaction with 236
Hydroxy group, acidic A65
Light, effect of, on A287
Nitric acid, effect on A161
Oxidation A286
  Potassium ferricyanide A193
Picric acid from A161
Pulp, determination in A193
Review 245
Solubilizing with air-steam P161
Spruce, aromatic content A65
Straw black liquor, determination in A139
  Structure A85
  Ultraviolet light, effect of A287
  Water vapor, sorption of 223
  Wood, location in 171
Lignin plastics P24
Lignocellulose, copper number, increasing P24
Lignosulphonic acid
  Alkali degradation products A85
  Birch, acetosyringone from A85
  Spruce, acetovanillone from A85
  Tanning with A160
Lime recovery at Gaylord Container Corporation 35
Limestone, sulphur compounds, determination of A159
Linen embossing A264
Linseed oil, tall oil as substitute A149
Lithium hydroxide, wood delignification by A85
Lithographic paper 25
Lithuania, paper industry in A288
Loblolly pine
  Fast growth, sulphite pulping 32
  Grinding with course stones 86
  Newsprint from 86
  Tree, position in, effect of 32
LODDENGAARD, P. M. Trends in the waste paper industry 218
Logarithm paper A239
Longleaf pine
  Chlorinated lignin, extraction of 99
  Fast growth, sulphite pulping 32
  Grinding with course stones 86
  Newsprint from 86
  Tree, position in, effect of 32

M

McCULLY, C. ROLAND. *See* Friedman, Leo.
McGOVERN, J. N., and CHIDESTER, G. H. Rate of temperature rise in sulphite pulping of western hemlock 155
McGOVERN, J. N., and CHIDESTER, G. H. Sulphite pulps from heartwood and sapwood of several growth types of western hemlock 162
  See also Chidester, G. H.
Machine costs, calculation 6
Machine hour rate, calculation 3
Machinery
  Abstracts 38, 39, 252, 263
  Creping A217
  History A288
McKee, F. J. *See* Warrick, L. F.
MACKLEM, C. E. Results of Beloit horizontal dual presses operating on various grades of paper 20
McNAUGHTON, G. C. *See* Chidester, G. H.
Macromolecular substances, constitution A75
Magnesium bicarbonate, removal from water 118
Magnesium chloride, effect on calcium hypochlorite 106
Malachite Green A169
Map paper A239
Marathon Paper Mills Co. A40
Material handling, pneumatic conveyors for A263
Mead Corporation A40
Mechanical process
  Abstracts 160, 287, 296
  Alkali pretreatment in A160
  Barium hydroxide to prevent pitch trouble A161
  Energy consumption, factors in A161
  Grinding action, analysis A161
  Grinding control A161
  Grinding efficiency A160
  Heat from pulpstones, effect of A161
  Pitch troubles A161
  Plasticity of wood at high temperature, effect of A161
  Production rate, factors in A161
  Sharpness factor and energy consumption A161
Mechanical pulp
  Burst strength and sharpness factor A161
  Classification A160
  Foam formation in A296
  Fractional screening A160
  Freeness and sharpness factor A161
  Fungus growth, Lignasan, effect of A296
  Light, effect of A287
  Paterson number A161
  Perforation A296
  Pine A161
    Foam prevention in A296
    Properties 87
  Review 254
  Sodium hydroxide, adsorption of 185
  Sorting machine A160
  Specific surface area A160
  Spruce A161
  Straw P160
  Ultraviolet light, effect of A287
  Yellowing A287
Metallic dendrites A40
Metallized paper, reinforced P217
Methyl acrylate resins, use in cigarette paper P1
Methylcellulose, sizing with P169
Mica, structure A170
Mill control methods, bleaching room A183
Mill wastes, flow measurement 15
Mills
  Southern A52
  West Virginia Pulp and Paper Co. A52
Mitsumata
  Alkali process, mechanism of A286
  Papermaking material A286
  Reducing sugars, rate of formation A286
Moisture indicator on machine P38
Moistureproofing composition P1
Mold
  Preshaping P24
  Pulp P24
Molded article P217
MORGAN, HOWARD, and DIXSON, HENRY PHILIP, Jr. Relation between chip length and uniformity of delignification in sulphite pulping 72
Morse chain drive 249
Mount Glamorgan causticizing system A139
Mucic acid, preparation from pine wood A286
Multistage bleaching A161
  Adsorption, role of A161
  Diffusion, role of A161
  Hydrogen ion concentration in A161
  Mechanism of A161
  Sulphite pulp 165

N

NAF circulation apparatus 41
Naphthenic acids, use in bag papers A239
Nessler's reagent for oxycellulose A75
New York and Pennsylvania Co. A40
News sulphite A149
Newsprint
  Alkaline filler in P229
  Loblolly pine for 86
  Longleaf pine for 86
  Pine
    Printing quality 88
    Properties 88
  Straw pulp by Pomilio process A97
Newsprint mill, operation A263
Nickel alloys, applications A40
Nitric acid
  Pulping with P296
  Wood, action on 23
Nitric acid process
  Bagasse A161
  Nitrophenols from A161
  Picric acid from A161
Nitrocellulose lacquers, coating with A230
Nitrogenous bases, effect on lignin determination A85
Nitrous acid, use in pulping P161
Nordiska Armaturfabrikerna circulation system 41
Nutting colorimeter A216

O

Oil penetration rate, calculation 210
Oil resistance of paper A230
Oil tracing paper A239
Opacity
  Eimer and Amend improved reflection meter 234
  Measurement of 284
Orifice installation 19
Oxford Paper Co. A40
Oxycellulose
  Definition A75
  Identification A75
  Solvents A75
Oxygen, use in pulping P161
"Oxygen number," bleached sulphite pulp 123

P

Packing costs, calculation 8
Paints, tall oil in A149
Paper
  Acidity, determination on A193
  Air removal by steam in sizing P169
  Air-resistance, specific A230
  Alkaline filler P229
  Aluminum, adsorption of A298
  Art, defects A230
  Artificially aged, color of 76
  Asphalt, fireproof P229
  Bakelite-impregnated A230
  Biological method of study 53
  Bursting test A216
  Bursting value A216
  Calcium carbonate in P229
  Carbon P229
  Chart A239
Chemical residues in A40
  Cigarette, artificial resins in P1
  Coated
    Cellulosic esters P263
    Nitrocellulose lacquers A230
    Paraffin odor troubles A239
  Color, measurement of A216
  Condenser A239
    Sulphate pulp for A230
  Conditioning
    Printing plant A288
    Rate of 26
    Temperature, role of 27
    Tests for 28
  Conversion
    Basis weight and cost 66

Maximum trim, formula for 67
Speed and cost 67
Conversion costs 66
Formula 66
Creping machinery A217
Crush tester A216
Defects A40
Dendritic growths A40
Dimensions and moisture content 27
Drawing A239
Elasticity A216
Electrical insulation A230
Gilsonite-vaseline in A229
Fireproofing A239
Food packages, requirements for A229
Formaldehyde-urea resin in P217
Formation P252
Fuzz detector 251
Glass fibers in P217
Glassine
Kraft pulp for P193
Transparency 198
Gloss and reflectivity, relation of A194
Gloss, measurement of 284
Graph A239
Groundwood, alkaline filler in P229
Hard A230
Heat, effect of 76
Heat aging
Bleach, effect of 81
Relative humidity, effect of 83
Rosin, effect of 77
Heliographic A239
Highly compressed P229
History A288
Hydrogen ion concentration, determination of A193
Hygroscopicity
Beating, effect of 223
Bleaching, effect of 223
Linear expansion 26
Lithographic 25
Logarithm A239
Map A239
Mechanical properties, effect of titanium pigments A239
Metallic dendrites A40
Metallized, reinforced P217
Moisture content
Indicator for P38
Rate of conditioning 26
Relative humidity, effect of 27
Temperature, effect of 27
Oil absorption A230
Oil resistance A230
Opacity, measurement of 284
Oven aging 76
Parchment P229
Paraffined P229
Physical properties, effect of titanium pigments A239
Plasticity A216
Polarized light, examination in A216
Printability, measure of A194
Printing, stresses in A288
Properties, effect of fillers on A170
Protein-formaldehyde coating P217
Rate of oil penetration, calculation 210
Reflectance
Eimer and Amend improved reflection meter 231
Measurement of 275
Reflectivity, gloss, relation of A194
Reinforced P229
Relative humidity and moisture content 27
Sanitary standards A229
Smoothness, relation to printability A194
Softness, relation to printability A194
Steam, aging in 82
Storage A37, A239
Titanium oxide in P229
Tracing A239
Warehouse for A37
Air conditioning in A37
Water transference mechanism A230
Water vapor permeability
Determination 213
Tests for A230
Waterproof P230
Thermal insulation from P1
Waterproofing A239
Naphthenic acids in A239
Urea-formaldehyde resin in P217
Paper hygroscope 28
Paper industry
Baltic states A288
Brazil A52
Colloid chemistry, applications of A288
Electrical developments A52
Engineering changes in A52
Esthonia A288
Financial review A40
Finland A288
France A288
Latvia A288
Lithuania A288
Microbiological control A40, A229
Nickel alloys in A40
Physics in A40
Ultraviolet light, use of, in A288
United States
History A288
Southern A52, A288
Paper machine
Alum, delivery of, to P252
Anti-friction bearings A38
Cylinder P263
Dyes, delivery of, to P252
Head box A252
Morse chain drive 249
Norwegian, wet end A38
Slice A252
Table A252
Wet end A38
Paper mill
Boiler installation A264
Fiber loss in 260
Hungarian A288
Illumination A264
Sanitary conditions in A229
Steam generation in 127
Time-cycle chart in 60
Waste flow in 260
Paper properties, review 257
Paper testing
Abstracts 183, 193, 216, 230
Bursting strength A216
Color A216
Review 257
Water-vapor permeability 213
Paperboard
Conditioning A216
Tests A216
Paperboard mills, quality control A217
Papermaking materials
Annual plants P86
Bagasse A65
Goldenrod A286
Solidago serotina A286
Sorghum A64
Straw P97
Patents A65
Willow bark P64
Paraffin
Coating
Containers P24
Two-stage P24
Odor troubles A239
Parchment paper P229
Kraft pulp for P193
Paraffined P229
Scraping roll in manufacture of P252
PARSONS, JOHN L., and JACKSON, DONALD T. Experimental multistage bleaching 165
Patents
Straw pulping A65
United States 11, G52, 207
Pectin, effect of hydrochloric acid on A75
Penetration, effect in sulphite process A149
Pentosans
Alkali sorption of pulp, effect on 187
Bagasse, isolation from P193
Beech wood, isolation from P193
Pulp, removal from P193
Permanganate number of pulp, determination A193
Permeability, water-vapor A230
Cell, membrane attachment to 213
Phenol-formaldehyde resins, use in water treatment 93
Phenols, effect on lignin determination A85
Phosphatides, foam prevention with P24
Photoelectric colorimeters, three-filter 285
Photoelectric instruments
Eimer and Amend improved reflection meter 231
Hunter multi-purpose reflectometer 275
Physics, applications in paper industry A40
Picea ajanensis, chemical composition A63
Picea glehnii Mast., pulping A64
Picea obovata, Ledeb., chemical composition A64
Pinewood
Branches, relation of A286
Chlorine process A97
Growth improvement A51
Heartwood-sapwood, differentiation of A51
Mechanical process, pitch troubles A161
Resin of A64
Southern, utilization A288
Water under pressure, effect of A286
Pinus caribaea. See Slash pine.
Pinus cembra, pulping with sodium sulphite A149
Pinus densiflora, chemical composition A64
Pinus echinata. See Shortleaf pine.
Pinus koraiensis, S. and Z., chemical composition A64
Pinus palustris. See Longleaf pine.
Pinus Taeda. See Loblolly pine.
Pipe, white water, cleaning of P252
Pitch
Lubricating oil, factor in A169
Mechanical process, troubles with A161
Rosin size as factor in A169
Plant design, time-cycle diagram 60
Plasticity of paper A216
Plastics, lignocellulose P24
Plates, molding P24
Playing card, washable P217
Polarized light, study of paper with A216
Pomilio process. *See* Chlorine process
Populus maximowitzii A. Henry, Chemical composition A64
Populus tremula L., chemical composition A64
Potassium ferricyanide
Lignin determination with A193
Pulp, action on A193
Potassium hydroxide, delignification with A85
Potassium iodate, stability of 124
Potassium nitrite, pulping with P161
POWELL, SHEPPARD T. Boiler feedwater treatment for high pressure boilers 89
Power
Abstracts 39, 264
Diesel A264
Hydraulic A264
Steam A264
Power plant
Container Corporation of America A39
Hinsdale Paper Mfg. Co. A39
PRELINGER, HERBERT. Washing of bleached sulphite and the introduction of a new method for its control 121, 262
Pressure
Pulp swelling, influence on A183
Water content of pulp, effect on 94
Price Bros. and Co., Ltd. A40
Printability
Measure of A194
Polarized light for study of A216
Printing pressure, relation of A194
Printing
Misregister, paper as cause of 26
Paper difficulties in A288
Pressure in relation to printability A194
Stresses on paper in A288
4-Propylcyclohexan-1, 2-diol from lignin 236
Propylcyclohexan-1-ol from lignin 236
Proteins, effect on lignin determinations A85
Prussian blue reaction for oxycellulose A75
Pullularia pullulans, effect of lignasan on A296
Pulp
Acid-alkali purification P193
Adsorption isotherms 224, 227
Agitator P297
Air mixture, molding P24
Alkali binding properties 184
Alkali purification, wetting agent in P193
Aluminum sulphate, adsorption of A297
Ash content, effect of sodium hydroxide 185
Bleach requirements, determination of A193
Bleaching, mill control methods A183
Calcium sulphite in A159
Chlorine value A183
Color, control in beater room 103
Consistency, control in beater room 103
Copper number and alkali sorption 187
Degree of beating, factors in A296
Desorption isotherms 227
Dielectric measurements A183
Dirt removal A252
Dyestuff adsorption A183
Evaluation A183
Fiber length, changes in A183
Fungus growth, lignasan in A296
Heat of wetting A183
Hydrator P297
Hygroscopicity A183
Drying, effect on 225
Hysteresis ratio 223
Kraft, bleaching P297
Lignin, determination of A193
Lignin content and alkali sorption 187
Linear shrinkage and degree of gelatinization 95
Metal hydroxides adsorption A183
Molding P24, P263
Optical properties A183
Oxygen number 262

Pebble mill beating, effect of.. 192
Pentosans, removal of P193
Perforation A296
Permanganate number A193
Potassium ferricyanide, action of A193
Rayon A160, A183, P193
Purification P193
Tests A183
Resins, removal of P193
Sodium chloride, adsorption of A297
Sodium hydroxide, adsorption of 184
Sodium sulphate, adsorption of A297
South Sakhalin A64
Statistics A52
Storage chest, agitator for..... P297
Sulphur compounds, determination of A159
Sulphur residues in A159
Sulphuric acid, adsorption of.. 188
Swelling, dilatometric method for A183
Swelling properties A183
Thickener P252
Thickness-swelling volume A183
Viscose rayon A160
Washing, degree of, determination 103
Water binding properties A183
Water retention 94
Beating effect of..... 94
Pressure, effect of 94
Water vapor, sorption of..... 223
X-ray measurements A183
Pulp industry
Microbiological control in A229
Nickel alloys in A40
Swedish, developments in A40
Pulp mills
Fiber losses in 260
Waste flow in 260
Pulp properties, review 256
Pulp purification 193
Pulp testing
Abstracts 183, 193, 216, 230
Mill control methods A183
Rayon manufacture A183
Review 256
Pulp washer, determination of efficiency 262
Pulp yield, experimental method for wood A85
Pulping
Acetic acid-nitrous acid-alkali.. P161
Air-steam P161
Alcohol P296
Ammonium sulphate and nitrogen base P97
Aniline P97
Calcium hydroxide P86
Chemical reactions in A63
Nitric acid A161, P296
Nitrous acid P161
Oxygen-steam P161
Pyridine P97
Research needed A51
Sodium sulphite A149
Impregnation, effect of .. A149
Sulphur dioxide
Aqueous P159
Liquid A159
Triethanolamine P97
Two stage—nitric acid-alkali.. P296
Zherebov process A149
Pulpstones
Artificial A160, A287
Preheating A287
Soviet A160
Dulling by grinding, effect of A161
Energy consumption, factors in A161
Grinding action, analysis of.... A161
Heat generated by, effect of.. A161
Quartz-cement A287
Segmented P287
Sharpness, numerical expression A161
Sharpness factor A161
Soviet, artificial A160
Pulpwood
Blue stain, effect of A63
Branches, relation of A286
Cedar A149
Conveying A263
Growth improvement A63
Swedish studies A51
Korean A64
Larix sibirica A149
Manchukuo A64
Philippine Islands A64
Piling A263
Pinus cembra A149
Plasticity in mechanical process A161
Siberian larch A149
Southern U. S. A288
Statistics A52, A64
Tropical woods A63
Tsuga heterophylla 150, 155
Western hemlock 150, 155
World supply A64
Pulverized coal firing 129
Pumps A52
Centrifugal A264
Pyridine, use in alkaline process.... P97

Q

Quality control 29

R

Rag pulp, adsorption of sodium hydroxide 185
Ramie cellulose, refractive index .. A75
Raw materials 51, 63, 286
Rayon
Pulp for.....A160, A183, P193
Purification P193
Sulphite A160
Tests A183
Recausticizing
Continuous 35
Gaylord Container Corporation.. 35
Red lauan, chemical analysis..... A64
REED, ROBERT F. Lithographic paper 25
Reel, drive P183
Refiner
Cowles P38
Disc A252
Refining
Economic factors in A252
Pulp swelling, effect on A183
Review A161
Reflectance
Definition 198
Measurement 275
Reflectivity
Gloss, relation of A194
Reflectometer
Eimer and Amend improved reflection meter 231
Hunter multi-purpose 275
REILEY, CHAS. E. The absorption of SO_2 in water 133
Reinforced paper P229
Relief gases
Coolers for 289
Heat recovery 194
Low pressure steam from 197
Turpentine recovery 194
Research
Norwegian A39
Wood, importance A51
Resins
Artificial
Cigarette paper, use in ... P1
Water treatment, use in.. 93
Calcium carbonate, coating of, with P298
Emulsification P298
Oil plasticized P298
Pinewood A64
Pulp, removal from P193
RILEY, RAY. Latest developments in water softening—carbonaceous zeolites 114
Robert Gair Co. A40
Rolls
Brass P39
Hydraulic pressure on P263
Monel-covered 68
Ribbed P39
Rubber P39
Roofing
Asphalt coating P1
Grooved, coating for..... P1
Roofing felt industry, sanitation in A40
Rosin
Colloid chemistry A288
Paper, heat aging, effect on.... 77
Rosin size
Dry P169
Oil resistance of paper, effect on A230
Pitch trouble, factor in..... A169
Rosin sizing
Chemistry of A297
Microscopical study 56
ROSS-ROSS, DONALD. Continuous grade costing in a paper mill 2
Rubber
Chlorinated, use in moisture-proofing composition P1
Constitution A75
Rubberoid industry, sanitation in.. A40
RUBUSH, J. P. Recausticizing and lime recovery at Bogalusa..... 34

S

S. D. Warren Co..... A40
SAMSON, TORSTEN. NAF circulation apparatus for sulphite and Sulphate pulp digesters..... 41
Sand filters, sulphurous acid treatment 93
Sanitation:
Roofing felt industry A40
Ruberoid industry A40
Sapwood
Adsorption isotherms 224
Color reaction A51
Heartwood, differentiation of.. A51
Satin white, coating of board with A37
SAVELL, WALTER L. Use of time cycle chart in plant design 60
Sawdust, sulphite process, experimental, use in A85
Scattering coefficients 80
Schauffelberger circulation system.. 44
SCHWARTZ, SIDNEY L., and BRAY, MARK W. Chemistry of the alkaline wood pulp processes, V. Effect of chemical ratio at constant initial concentration and the effect of initial concentration on the rate of delignification and hydrolysis of Douglas fir by the sulphate process 140
Scott Paper Co. A40
Scraping roll for parchment paper manufacture P252
Screen, centrifuge P264
Sebacyl glycerate, use in coating.. A170
SEBORG, C. O., SIMMONDS, F. A., and BAIRD, P. K. Sorption of water vapor by papermaking materials. Irreversible loss of hygroscopicity due to drying 223
SEIBERLICH, J. Influence of nitric acid on wood..... 23
Sharpness factor of pulpstones A161
Sheet plates A264
Sheets, molding P24
Shingle, thick-butt P1
Shipping costs, calculation 8
Shortleaf pine
Fast growth, sulphite pulping. 32
Tree, position in, effect of.... 32
Showcards, warping A263
Siberian larch
Decayed, pulping A149
Pulping, sodium sulphite..... A149
Silica, removal from feed water.... 90
Siliceous zeolites, properties..... 115
SIMMONDS, F. A. *See* Arnold, G. C.; Seborg, C. O.
Size
Bewoid..... A298
Dry rosin P169
White A297
Sizing 169, 297
Air removal with steam in..... P169
Calcium carbonate-filled paper. P298
Calcium carbonate-resin P298
Casein, soy bean P169
Cellulose ethers P169
Chemistry of A297
Drying of paper, effect of A298
Emulsions for P169
Ethycellulose P169
Glue, microscopic study 57
Hydrogen ion concentration, effect of A297
Hydroxyethylcellulose P169
Insulating board A37
Mechanism A169
Methylcellulose P169
Predried paper A298
Review 256
Rosin, microscopic study 56
Rosin-soybean casein P169
Soybean casein P169
Starch A169
Cold swelling P298
Slash pine
Fast growth, sulphite pulping. 32
Tree, position in, effect of..... 32
Slice P263
Design and operation..... A252
Slime control A40
SMITH, B. F. *See* DuBois, H. A.
Smoothness, relation to printability A194
Soap, sulphite waste liquor in....P160, P287
Soda cooking liquor, effect on wood structure 171
Sidium beryllate, solubility of oxycellulose in A75
Sodium bicarbonate, removal from water 118
Sodium carbonate, solubility of chlorinated lignin in 98
Sodium chloride
Adsorption by pulp A297
Wood delignification, effect on A86
Sodium hydroxide
Chlorinated lignin, solubility of, in 98
Pulp, adsorption by 184
Pulp swelling in A183
Wood delignification, effect on A85
Sodium nitrite, use in pulping P161
Sodium resinate, sizing with..... A298
Sodium silicate
Chlorinated lignin, solubility of, in 98
Colloid chemistry A288
Fiber board, adhesive for..... P24
Sodium sulphate, adsorption by pulp A297
Sodium zeolite in water treatment.. 116
Sodium zincate, solubility of oxycellulose in A75
Softness, relation to printability... A194
Solidago serotina, papermaking material A286
Sorghum, pulping A64
Sorption apparatus, Forest Products Laboratory 225
Southern pine
Blue-stained, pulping A63
Fast growth, chemical properties 33

Springwood content, effect of growth 32
Tree, position in, effect of..... 32
Soybean casein, sizing with..... P169
SPECHT, HARRY G., and CONNOR, C. M. Factors influencing drainage through Fourdrinier wires 48
Specialties, paper abstracts 1, 24, 37, 216, 229, 239, 263
Specific surface area of mechanical pulp A160
Springwood
Bursting strength, effect on .. 34
Folding strength, effect on ... 34
Tearing strength, effect on.... 34
Sprucewood
Delignification rate
Acid concentration, effect of A159
Density A64
Growth improvement A51
Growth rate A64
Rosin difficulties A161
Sapwood, sorption of water vapor by 223
Stain, heartwood-sapwood A51
Starch
Biological method of study ... 55
Board, coating of, with..... A37
Cold-swelling P298
Colloid chemistry P288
Enzymes, action of A169
Filler retention, effect on A170
Sizing P298
Tub size, conversion for..... A169
Steam
Air removal of, by, in sizing.. P169
High pressure
Economics 109
Equipment cost 112
Heat economy 110
Low pressure, from relief gases 197
Steam boilers, selective factors ... 128
Steam generating equipment, selective factors 128
Steam plants, trends in 128
Steam pressure
Boiler feed pump pressure, effect on 112
Fuel ratios 112
Turbine efficiency, effect on... 111
Steam turbine
Anchor point 110
Efficiency 111
Steam turbo-generator A52
STEVENSON, LOUIS T. *See* TAPPI Production Management Committee
Stock level
Control A252
Recording equipment A252
Stock pressure
Control A252
Recording equipment A252
Storage, influence of, on pulp swelling A183
Stramenta process A230
Straw
Lime pulping P217
Mechanical pulp from P160
Pomilio process A97
Pulping
Control of A139
Patents on A65
Strawboard cleanliness..... A263
Stream pollution studies 259
Surface solution in A51
Submerged weir 18
Sucrose, effect of hydrochloric acid A75
Sugar, fermentable, determination in sulphite waste liquors A159
Sulphate cooking liquor, effect on wood structure 171
Sulphate digester
NAF circulation apparatus 41
Scale in 47
Sulphate mills, heat utilization in.. A97
Sulphate pulp
Bleaching A161
Chemical ratio, effect of 140
Douglas fir 140
Sulphate process
Heterogeneous reaction in..... 146
Initial concentration, effect of. 140
Kinetics of 146
Yield data, formula for..... 147
Sulphate recovery thermal code.... 69
Sulphite cooking liquor
Bleach consumption, effect on A194
Composition and rate of delignification A159
Concentration, effect of..... A149
Cooler for 292
Dirt in pulp, effect on..... A194
Sulphur compounds, determination of A159
Wood structure, effect on..... 171
Sulphite digester
NAF circulation apparatus .. 41
Scale formation in..... 45
Sulphite news A149
Sulphite process
Abstracts 159, 287
Acid concentration, role of.... A149
Acid-wood ratio A149
Alkali impregnation in P97
Chip packing, effect of..... A159
Circulation, effect of A149
Coolers, types of 289
Digester, stainless steel, for... A85
Experimental, sawdust for A85
Fast growth pines in..... 32
Lime concentration, effect of.. A149
Liquid sulphur dioxide in..... A159
Mechanism A159
Penetration period, effect of.. A149
Review 246
Russian problems A149
Spruce wood, rate of delignification A159
Sulphur compounds in pulp, cause of A159
Sulphur dioxide, aqueous, use of P159
Temperature rise, role of..... 155
Temperature schedule 155
Western hemlock, growth rate, effect of 162
Sulphite pulp
Bleached
Color reversion 121
Washing 121, 262
Control test 123
Oxygen number test 123
Potassium iodate test 123
Blue stained southern pine A63
Characteristics A160
Dirt content, causes of..... A194
Fine papers, use for..... A160
Folding boxboard, use for..... A160
Homogeneity, factors in..... A149
Multistage bleached, properties 165
Multistage bleaching 165
News, properties of A149
Strength, effect of acid concentration A149
Uniformity, factors in..... A149
Sulphite pulping
Chip length, role of..... 72
Uniformity, chip length and... 72
Sulphite relief gases, coolers for.... 289
Sulphite waste liquor
Alkali-alcohol treatment P160
Core oil, use as A160, P160
Electroplating, use in..... P287
Oxidation P287
Purification P160
Review 247
Soap, use in.....A160, P287
Stream pollution by 261
Sugar, fermentable, determination of A159
Sugar content, effect of acid concentration A149
Tanning power A160, A287, P287
Vanillin from P287
Yeast from A160
Sulphonated alcohols, use in pulp purification P193
Sulphonated oils, use in pulp purification P193
Sulphur, burning under pressure.. A287
Sulphur burner, compressed air for A287
Sulphur dioxide
Absorber 134
Absorption
Gas velocity, effect of.... 135
Liquor velocity, effect of.. 137
Temperature, effect of..... 137
Absorption coefficient 134
Liquid, pulping with..... A159
Water, absorption in..... 133
Sulphur residues in pulps..... A159
Sulphuric acid
Drainage, effect on 48
Pulp, adsorption by 188
Sulphurous acid, feedwater treatment with 93
Supercalender, power consumption. A264
Superheated steam, use in alkaline process P97
Surface condenser, blowdown heat recovery 194
Sutherland Paper Co. A40

T

Table, Voith and Co..... A252
Taggart Corporation A40
Tall oil
Gasoline, purification with..... P287
Lacquer industry, use in..... A149
Linseed oil substitute A149
Paints, use in A149
Refining P287
Tanning, sulphite waste liquor for A160, A287, P287
Tapioca starch, conversion to tub size A169
TAPPI Paper Testing Committee, report A193
TAPPI Production Management Committee. Survey of quality control and inspection in paper mills 29
TAPPI Waste Committee. Flow measurements of mill wastes.... 15
Tearing strength, effect of springwood content 34
Technical department
Incentives in..... 31
Organization chart..... 31
Quality control, relation to.... 29
Temperature
Beating, role in..... A170
Board, moisture content, effect on A193
Degree of beating, effect on.. A296
Drainage, effect on..... 48
Felt life, effect on..... A264
Sodium sulphite pulping, effect on A149
Wood delignification, effect on A86
Tensile strength
Copper number, relation of... A75
Growth rate, effect of..... 33
Viscosity, relation of..... A75
Tesch causticizing system..... A139
Thermal beating relations..... A170
Thermal insulation..... P1
Thickness-swelling volume of pulp A183
Tilia mandshurica R. and M., chemical composition..... A64
Time cycle diagram..... 60
Tin-gold reaction for oxycellulose. A75
Titanium oxide in paper..... P229
Titanium pigments, effect on paper properties A239
Tomlinson process, black liquors.. A86
TONGREN, JOHN C. Reflectance method for the study of discoloration of artificially aged papers... 76
Tracing paper..... A239
Transmittance, definition..... 198
Transparent embossing..... A264
Transparency
Contrast ratio, relation of.... 205
Contrast visibility, relation of 204
Photometric measuring device 199
Reflectance, relation of..... 202
Transmittance, relation of.... 202
Transparency meter..... 199
Transparency ratio, definition..... 198
Triethanolamine, pulping with..... P97
Tropical woods, used as pulpwoods A63
Tub size, starch conversion for.... A169
Tunnel drier, cardboards..... A217
Turpentine, recovery from relief gases 194

U

Ultramarine, suspension, stability of A169
Ultraviolet light
Lignin, effect on..... A287
Mechanical pulp, effect on.... A287
Uses in paper industry..... A288
Ulvic light, artificial aging, use in A216
Urea-formaldehyde resin for waterproofing P217
Uronic acids, alkali sorption of pulp, effect on..... 187

V

V-notch weirs..... 15
Vacuum, heat aging of paper in... 82
Vacuum filters, multiple-stage..... A39
Vanillin, sulphite waste liquor for. P287
Vaseline-gilsonite in electric insulation paper..... A229
Venturi flume..... 17
Velox boiler..... A39
de Verdier system of heat utilization A97
Verigraph 28
Vinyl resins as adhesives..... A288
Viscose rayon, pulp for..... A160
Viscosity, relation of tensile strength A75
Vortrap A252

W

Wall paper
Metal-surfaced P217
Nitrocellulose coating..... A230
Protein-formaldehyde coating.. P217
Washable P217
WARRICK, L. F., and McKEE, F. J. Reduction of pulp and paper wastes in stream cleaning program in Wisconsin..... 259
Washing
Diffusers in..... A39
Vacuum filters in..... A39
Waste paper
Cowles classifiner for..... A252
Market trends..... 218
Water
Hardness, effect on drainage.. 48
Microbiological control..... A40
Purification 89
Zeolite softening..... 91
Water color drawing paper..... A239
Water treatment
Artificial resins in..... 93
Carbonaceous zeolite..... 114
"Cation exchange" reaction in 117
Sodium bicarbonate removal.. 117
Sulphurous acid in..... 93
Water vapor

Lignin, sorption by..... 223
Pulp sorption by..... 223
Wood, sorption by..... 223
Water vapor permeability
Cell, membrane attachment to. A213
Tests for..... A230
Watermarking A230
Waterproofing P230
Cardboard P217
Cellulose esters..... A239
Cellulose ethers..... A239
Emulsions for..... A239
Formaldehyde-urea resin for.. P217
Naphthenic acids in..... A239
WATSON, C. G. Monel covered rolls 68
Wax sizing, insulating board..... A37
Weir 15
Submerged 18
WEST, CLARENCE J. United States patents on papermaking 11, 207
West Virginia Pulp and Paper Co. Charleston mill..... A40 A52
Western hemlock
Alpha-cellulose content, effect of growth rate..... 151
Cellulose content, effect of growth rate..... 151
Density, effect of growth rate. 151
Extractives content, effect of growth rate 151
Heartwood
Composition 162
Sulphate pulping 162
Pentosan content, effect of growth rate..... 151
Pulp yields
effect of growth rate..... 153, 162
Rate of temperature rise, effect of..... 155
Sapwood
Composition 162
Sulphite pulping..... 162
Springwood
Density, effect of growth rate 151
Growth rate..... 151
Sulphite pulping
Age, effect of..... 150
Growth rate, effect of.... 150, 162
Properties 152, 158, 162
Rate of temperature rise, effect on..... 155
Wet felts, increased life..... A264
Wetting agents, use in pulp purification P193
White water
Calcium sulphate, addition of. P252
Fiber recovery..... P38
Filter P38
Recirculation P252
Wire, addition to..... P38
White water loss, calculation..... 7
White water pipes, cleaning..... P252
WICKER, DAN B. The fundamentals of glassine transparency. II. Instrumental studies..... 198
WILLIAMS, F. M. Studies of freeness upon a recording freeness tester 191
Williams precision recording freeness tester..... 191
Willow bark, pulping..... A64
Winder, collar..... P39
Wire
Cleaning A264
Cleaning agents..... A38
Drainage factors..... 48
Filler addition to web on..... P298
Mesh, effect on drainage..... 48
Pulp flow on..... P263
Seams, brazed..... P38
Shake P38
Support P263
Wear A264
Wire guide, regulating device..... P252
Wood
Acetyl groups, determination of A51
Chemical structures..... A63
Chemistry A63, A64
Review 240
Degree of gelatinization..... 94
Lignin removal with alkali.... P296
Lithium hydroxide, action of.. A85
Nitric acid, action of..... 23
Oxidation of..... 23
Potassium hydroxide, action of A85
Preservation A64
Pulp yield, method for..... A85
Research needed..... A51
Sodium hydroxide, action of.. A85
Structure
Kraft digestion, effect of.. 171
Soda digestion, effect of.. 171
Sulphate digestion, effect of 171
Sulphite digestion, effect of 171
Water vapor, sorption of..... 223
Wood fiber, structure..... 180
Wood pulp, effect of chloroacetic acid A85
Wool-asbestos felts..... A264
Wrapping paper, food..... P229
Food P229
Bacterial control..... A40
Wrinkles, cause of..... A37

X

Xylonic acid, preparation from pine-wood A286

Y

Yacal, chemical composition..... A64
Yankee machine, increased production with..... A298
Yeast, sulphite waste liquor for.... A160

Z

Zefasit process..... A230
Zeo-Dur water treatment..... 115
Zeo-Karb H water treatment..... 114
Zeolite water treatment..... 114
Zherebov pulping process..... A149

Delaware Valley TAPPI Discusses Lithography

About fifty members of the Delaware Valley Section of the Technical Association of the Pulp and Paper Industry met at the Engineers Club, Philadelphia, Pa., Friday evening, January 13, 1939. C. M. Connor of the Valley Forge Laboratories, Conshohocken, Pa., presided as chairman.

Frederic C. Clark, president of TAPPI, was present and commented on a number of the Association's activities and plans.

The speaker of the evening was C. G. Weber of the National Bureau of Standards, Washington, D. C., who discussed "Studies on Paper for Lithographing". Hugo H. Hanson, president of W. C. Hamilton & Sons, Miquon, Pa., presided during the discussion of this paper. Mr. Weber outlined the work done in cooperation with the Lithographic Technical Foundation.

Among the comments made by Mr. Weber and others present were as follows: The hopeful aim of the study has been to get paper to change a minimum in dimension during printing. This is difficult because paper is naturally hygroscopic. To get the best printing effect the paper should have a moisture content about one half per cent above that which is in equilibrium with the humidity in the print shop. Careful air conditioning is necessary.

Mr. Weber cited the care with which paper is stored and handled for use in reproducing the Coast and Geodedic Survey maps on which 24 colors on one side and nine on the other are printed. The paper should be wrapped in moisture resistant paper such as duplex kraft with asphalt binder. Much progress has been made in getting the printers to use the sword hygrometer. This has resulted in using paper of the proper moisture content for printing.

Mechanical action such as beating affects sheet dimensions but not as much as moisture and humidity. Paper received cold tends to condense moisture and have wavy edges. It is diffcult to get rid of waves. Paper is usually made too dry. Printers can correct for deficiencies in one direction of the sheet but not for two.

In addition to curl due to moisture it is possible for paper to have a mechanical deformation produced in manufacture. Paper, to produce good printing results, should have about 7 per cent moisture in summer and 5.5 to 6.0 in winter.

The speaker for the meeting on February 10 will be Robert B. Wolf, manager of the Pulp Division, Weyerhaeuser Timber Company, Longview, Wash., who will talk on "Recent Developments in Sulphite Pulping".

Among those present were: S. M. Cooper, R. M. Bates, E. J. Albert, J. Carl Schmidt, J. B. Atwater, J. D. Davis, R. H. Underdown, Chas. A. Shubert, Fred Streicher, Robert E. Smith, H. M. Wilson, E. E. Helm, E. H. Koontz, H. Hulmes, E. V. Romaine and G. L. Olson, Philadelphia, Pa.; S. G. Briscoe, G. L. Schwartz and Samuel M. Bratton, Wilmington, Del.; R. T. Bingham, J. J. Lafferty, E. I. Stokes, R. G. Macdonald and Alex. McInnes, Jr., New York City; W. P. Richardson, Camden, N. J.; W. E. Brow, Manayunk, Pa.; C. G. Weber, Washington, D. C.; H. H. Hanson, Miquon, Pa.; Frederic C. Clark, Newton, Mass.; James d'A. Clark and F. W. Brainerd, Chester, Pa.; C. G. Albert and George J. Lane, Metuchen, N. J.; Adolf Shnabel, Lansdowne, Pa., and C. M. Connor, Conshohocken, Pa.